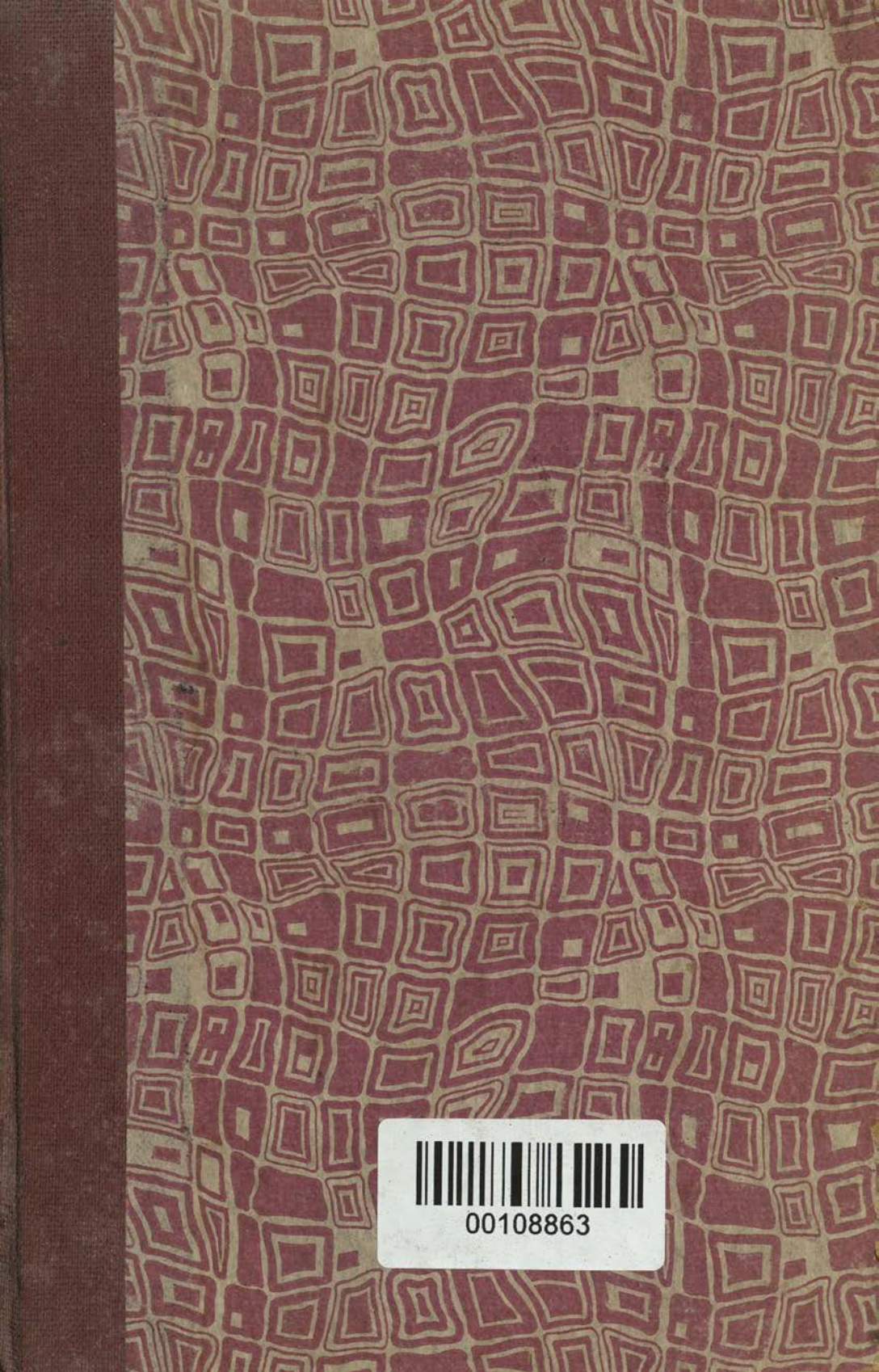
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Royal Commission on Agriculture in India.

VOLUME XI.

Evidence taken in Sind.

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TERMS OF REFERENCE

Generally,

To examine and report on the present conditions of agriculture and rural economy in British India and to make recommendations for the improvement of agriculture and the promotion of the welfare and prosperity of the rural population;

In particular to investigate—

(*a*) the measures now being taken for the promotion of agricultural and veterinary research, experiment, demonstration and education, for the compilation of agricultural statistics, for the introduction of new and better crops and for improvement in agricultural practice, dairy farming and the breeding of stock;

(*b*) the existing methods of transport and marketing of agricultural produce and stock;

(*c*) the methods by which agricultural operations are financed and credit afforded to agriculturists;

(*d*) the main factors affecting rural prosperity and the welfare of the agricultural population;

and to make recommendations.

It will not be within the scope of the Commission's duties to make recommendations regarding the existing system of landownership and tenancy or of the assessment of land revenue and irrigation charges, or the existing division of functions between the Government of India and the local Governments. But the Commission shall be at liberty to suggest means whereby the activities of the Governments in India may best be co-ordinated and to indicate directions in which the Government of India may usefully supplement the activities of local Governments.

QUESTIONNAIRE

PART I

Question.

1. Research.
2. Agricultural Education.
3. Demonstration and Propaganda.
4. Administration.
5. Finance.
6. Agricultural Indebtedness.
7. Fragmentation of Holdings.

PART II

8. Irrigation.
9. Soils.
10. Fertilisers.
11. Crops.
12. Cultivation.
13. Crop Protection.
14. Implements.

PART III

15. Veterinary.
16. Animal Husbandry.

PART IV

17. Agricultural Industries.
18. Agricultural Labour.
19. Forests.
20. Marketing.
21. Tariffs and Sea Freights.
22. Co-operation.
23. General Education.
24. Attracting Capital.
25. Welfare of Rural Population.
26. Statistics.

QUESTIONNAIRE

Part I

1. Research.

(*a*) Have you suggestions to advance for the better organisation, administration and financing of—

(*i*) All research affecting the welfare of the agriculturist, including research into the scientific value of the indigenous theory and traditional methods of agriculture,

(*ii*) Veterinary research ?

(*b*) If in cases known to you progress is not being made because of the want of skilled workers, or field or laboratory facilities for study or by reason of any other handicaps, please give particulars. [Suggestions of a general kind should be made under (*a*); answers under this heading should relate to specific subjects. The purpose is to secure a list of the problems met with by scientific investigators in the course of their work which are being held over because of lack of resources or deficient organisation.]

(*c*) Can you suggest any particular subject for research not at present being investigated to which attention might usefully be turned ?

2. Agricultural Education.

With reference to any form of agricultural education of which you may have experience, please state your views on the following :—

(*i*) Is the supply of teachers and institutions sufficient ?

(*ii*) Is there an urgent need for extension of teaching facilities in any district or districts known to you personally ?

(*iii*) Should teachers in rural areas be drawn from the agricultural classes ?

(*iv*) Are the attendances at existing institutions as numerous as you would expect in present circumstances ; if not, state reasons. Can you suggest measures likely to stimulate the demand for instruction ?

(*v*) What are the main incentives which induce lads to study agriculture ?

(*vi*) Are pupils mainly drawn from the agricultural classes ?

(*vii*) Are there any modifications in existing courses of study which appear to be called for ; if so, what are they ?

(*viii*) What are your views upon (*a*) nature study ; (*b*) school plots ; (*c*) school farms ?

(*ix*) What are the careers of the majority of students who have studied agriculture ?

(*x*) How can agriculture be made attractive to middle class youths ?

(*xi*) Are there recent movements for improving the technical knowledge of students who have studied agriculture ?

(*xii*) How can adult education in rural tracts be popularised ?

(*xiii*) In suggesting any scheme for better educational facilities in rural areas, please give your views for (*a*) its administration and (*b*) its finance.

3. Demonstration and Propaganda.

(*a*) What are the measures which in your view have been successful in influencing and improving the practice of cultivators ?

(*b*) Can you make suggestions for increasing the effectiveness of field demonstrations ?

(*c*) Can you suggest methods whereby cultivators may be induced to adopt expert advice ?

(*d*) If you are aware of any striking instances of the success or the failure of demonstration and propaganda work, please give particulars and indicate the reasons for success or for failure.

4. Administration.

(*a*) Do you wish to suggest means towards the better co-ordination of the activities of the Governments in India or to indicate directions in which the Government of India may usefully supplement the activities of the local Governments ?

(*b*) Is it your opinion that the expert scientific knowledge required in the development of agriculture in the different Provinces could be supplied to a greater extent than is the case at present by increasing the scientific staff of the Government of India ? If so, indicate the types of work which would benefit by pooling the services of experts, and suggest how that work should be controlled.

(*c*) Are you satisfied from the agricultural standpoint with the services afforded by—

(*i*) The Agricultural and Veterinary Services,

(*ii*) Railways and steamers,

(*iii*) Roads,

(*iv*) Meteorological Department,

(*v*) Posts, and

(*vi*) Telegraphs, including wireless ?

If not, please indicate directions in which you think these Services might be improved or extended.

5. Finance.

(*a*) What are your views as to the steps that should be taken for the better financing of agricultural operations and for the provision of short and long-term credit to cultivators ?

(*b*) Do you wish to suggest means whereby cultivators may be induced to make fuller use of the Government system of *taccavi* ?

6. Agricultural Indebtedness.

(*a*) What in your opinion are :—

(*i*) the main causes of borrowing,

(*ii*) the sources of credit, and

(*iii*) the reasons preventing repayment.

(*b*) What measures in your opinion are necessary for lightening agriculture's burden of debt ? For example, should special measures be taken to deal with rural insolvency, to enforce the application of the Usurious Loans Act, or to facilitate the redemption of mortgages ?

(*c*) Should measures be taken to restrict or control the credit of cultivators such as limiting the right of mortgage and sale ? Should non-terminable mortgages be prohibited ?

7. Fragmentation of Holdings.

(*a*) Do you wish to suggest means for reducing the loss in agricultural efficiency attendant upon the excessive subdivision of holdings ?

(*b*) What are the obstacles in the way of consolidation and how can they be overcome ?

(*c*) Do you consider legislation to be necessary to deal with minors, widows with life interest, persons legally incapable, alienation and dissentients, and to keep disputes out of the courts ?

PART II

8. Irrigation.

(*a*) Name any district or districts in which you advocate the adoption of new irrigation schemes, or suggest extensions or improvements in the existing systems or methods of irrigation by—

(*i*) Perennial and non-perennial canals,
(*ii*) Tanks and ponds,
(*iii*) Wells.

What are the obstacles in your district or Province to the extension of irrigation by each of the above methods ?

(*b*) Are you satisfied with the existing methods of distributing canal water to cultivators ? Describe the methods that have been employed to prevent wastage of water by evaporation and by absorption in the soil. What form of outlet for distribution to cultivators at the tail end do you regard as the most equitable and economical ? Have these methods and devices been successful, or do you wish to suggest improvements ?

(*N.B.*—Irrigation charges are *not* within the terms of reference of the Commission, and should not be commented upon.)

9. Soils.

(*a*) Have you suggestions to make—

(*i*) for the improvement of soils, whether by drainage or other means, not dealt with under other headings in this questionnaire.
(*ii*) for the reclamation of Alkali (Usar) or other uncultivable land,
(*iii*) for the prevention of the erosion of the surface soil by flood water ?

(*b*) Can you give instances of soils known to you which, within your recollection, have—

(*i*) undergone marked improvement,
(*ii*) suffered marked deterioration ?

If so, please give full particulars.

(*c*) What measures should Government take to encourage the reclamation of areas of cultivable land which have gone out of cultivation ?

10. Fertilisers.

(*a*) In your opinion, could greater use be profitably made of natural manures or artificial fertilisers ? If so, please indicate the directions in which you think improvement possible.

(*b*) Can you suggest measures to prevent the fraudulent adulteration of fertilisers ?

(*c*) What methods would you employ to popularise new and improved fertilisers ?

(*d*) Mention any localities known to you in which a considerable increase in the use of manures has recently taken place.

(*e*) Has effect of manuring with phosphates, nitrates, sulphate of ammonia, and potash manures been sufficiently investigated ? If so, what is the result of such investigation ?

(*f*) What methods would you employ to discourage the practice of using cowdung as fuel ?

11. Crops.

(*a*) Please give your views on—

(*i*) the improvement of existing crops,

(*ii*) the introduction of new crops including fodder crops,

(*iii*) the distribution of seeds,

(*iv*) the prevention of damage by wild animals.

(*b*) Can you suggest any heavy yielding food crops in replacement of the present crops ?

(*c*) Any successful efforts in improving crops or substituting more profitable crops which have come under your own observation should be mentioned.

12. Cultivation.

Can you suggest improvements in—

(*i*) the existing system of tillage, or

(*ii*) the customary rotations or mixtures of the more important crops ?

13. Crop Protection, Internal and External.

Please give your views on—

(*i*) The efficacy and sufficiency of existing measures for protection of crops from external infection, pests and diseases.

(*ii*) The desirability of adopting internal measures against infection.

14. Implements.

(*a*) Have you any suggestion for the improvement of existing, or the introduction of new, agricultural implements and machinery ?

(*b*) What steps do you think may usefully be taken to hasten the adoption by the cultivator of improved implements ?

(*c*) Are there any difficulties which manufacturers have to contend with in the production of agricultural implements or their distribution for sale throughout the country ? If so, can you suggest means by which these difficulties may be removed ?

PART III

15. Veterinary.

(*a*) Should the Civil Veterinary Department be under the Director of Agriculture or should it be independent ?

(*b*) (*i*) Are dispensaries under the control of Local (District) Boards ? Does this system work well ?

(*ii*) Is the need for expansion being adequately met ?

(*iii*) Would you advocate the transfer of control to Provincial authority ?

(*c*) (*i*) Do agriculturists make full use of the veterinary dispensaries ? If not, can you suggest improvements to remedy this ?

(*ii*) Is full use made of touring dispensaries ?

(*d*) What are the obstacles met with in dealing with contagious diseases ? Do you advocate legislation dealing with notification, segregation, disposal of diseased carcases, compulsory inoculation of contacts and prohibition of the movement of animals exposed to infection ? Failing legislation, can you suggest other means of improving existing conditions ?

(*e*) Is there any difficulty in securing sufficient serum to meet the demand ?

(*f*) What are the obstacles in the way of popularising preventive inoculation ? Is any fee charged, and, if so, does this act as a deterrent ?

(*g*) Do you consider that the provision of further facilities for research into animal disease is desirable ?

If so, do you advocate that such further facilities should take the form of—

(*i*) an extension of the Muktesar Institute, or

(*ii*) the setting up, or extension of, Provincial Veterinary Research Institutions ?

(*h*) Do you recommend that special investigations should be conducted by—

(*i*) officers of the Muktesar Institute, or

(*ii*) research officers in the Provinces ?

(*i*) Do you recommend the appointment of a Superior Veterinary Officer with the Government of India ? What advantages do you expect would result from such an appointment ?

16. Animal Husbandry.

(*a*) Do you wish to make suggestions for—

(*i*) improving the breeds of livestock,

(*ii*) the betterment of the dairying industry,

(*iii*) improving existing practice in animal husbandry

(*b*) Comment on the following as causes of injury to cattle in your district—

(*i*) Overstocking of common pastures,

(*ii*) Absence of enclosed pastures, such as grass borders in tilled fields,

(*iii*) Insufficiency of dry fodder such as the straw of cereals or the stems and leaves of pulses,

(*iv*) Absence of green fodders in dry seasons,

(*v*) Absence of mineral constituents in fodder and feeding stuffs.

(*c*) Please mention the months of the year in which fodder shortage is most marked in your district. For how many weeks does scarcity of fodder usually exist ? After this period of scarcity ends how many weeks elapse before young growing cattle begin to thrive ?

(*d*) Can you suggest any practicable methods of improving or supplementing the fodder supply that would be applicable to your district ?

(*e*) How can landowners be induced to take a keener practical interest in these matters ?

Part IV

17. Agricultural Industries.

(*a*) Can you give any estimate of the number of days of work done by an average cultivator on his holding during the year ? What does he do in the slack season ?

(*b*) Can you suggest means for encouraging the adoption of subsidiary industries ? Can you suggest any new subsidiary industries to occupy the spare time of the family which could be established with Government aid ?

(*c*) What are the obstacles in the way of expansion of such industries as beekeeping, poultry rearing, fruit growing, sericulture, pisciculture, lac culture, rope making, basket making, etc. ?

(*d*) Do you think that Government should do more to establish industries connected with the preparation of agricultural produce for consumption, such as oil pressing, sugar making, cotton ginning, rice hulling, utilisation of wheat straw for card-board, utilisation of cotton seed for felt, fodder, oil and fuel, utilisation of rice straw for paper, etc. ?

(*e*) Could subsidiary employment be found by encouraging industrial concerns to move to rural areas ? Can you suggest methods ?

(*f*) Do you recommend a more intensive study of each rural industry in its technical, commercial and financial aspects, with a view to, among other things, introduction of improved tools and appliances ?

(*g*) Can you suggest any other measures which might lead to greater rural employment ?

(*h*) Can you suggest means whereby the people could be induced to devote their spare time to improving the health conditions of their own environment ?

18. Agricultural Labour.

(*a*) What measures, if any, should be taken to attract agricultural labour from areas in which there is a surplus to—

(*i*) areas under cultivation in which there is a shortage of such labour ? and

(*ii*) areas in which large tracts of cultivable land remain uncultivated ?

Please distinguish between suggestions designed to relieve seasonal unemployment and proposals for the permanent migration of agricultural population.

(*b*) If there is any shortage of agricultural labour in your Province, what are the causes thereof and how could they be removed ?

(*c*) Can you suggest measures designed to facilitate the occupation and development, by surplus agricultural labour, of areas not at present under cultivation ?

19. Forests.

(*a*) Do you consider that forest lands as such are at present being put to their fullest use for agricultural purposes ? For instance, are grazing facilities granted to the extent compatible with the proper preservation of forest areas ? If not, state the changes or developments in current practice which you consider advisable.

(*b*) Can you suggest means whereby the supply of firewood and fodder in rural areas may be increased ?

(*c*) Has deterioration of forests led to soil erosion ? What remedies would you suggest for erosion and damage from floods ?

(*d*) Can you indicate any methods by which supply of moisture in the soil, the rainfall and supply of canal water can be increased and regulated by afforestation or by the increased protection of forests so as to benefit agriculture ? Would the same methods be useful in preventing the destruction by erosion of agricultural land ?

(*e*) Is there an opening for schemes of afforestation in the neighbourhood of villages ?

(*f*) Are forests suffering deterioration from excessive grazing ? Is soil erosion being thereby facilitated ? Suggest remedies.

20. Marketing.

(*a*) Do you consider existing market facilities to be satisfactory ? Please specify and criticise the markets to which you refer, and make suggestions for their improvement.

(*b*) Are you satisfied with the existing system of marketing and distribution ? If not, please indicate the produce to which you refer and describe and criticise in detail the channels of marketing and distribution from the producer to the consumer in India (or exporter in the case of produce exported overseas). State the services rendered by each intermediary and whether such intermediary acts in the capacity of merchant or commission agent, and comment upon the efficiency of these services and the margins upon which such intermediaries operate. Please describe

the method by which each transaction is financed, or in the case of barter, by which an exchange is effected.

(*c*) Do you wish to suggest steps whereby the quality, purity, grading or packing of agricultural produce may be improved, distinguishing where possible between produce destined for—

(*i*) Indian markets ?

(*ii*) Export markets ?

(*d*) Do you think that more effective steps might be taken to place at the disposal of cultivators, merchants and traders information as to market conditions, whether Indian or overseas ; crop returns ; complaints as to Indian produce from wheresoever originating ; and agricultural and marketing news in general ?

21. Tariffs and Sea Freights.

Do existing (*a*) customs duties, both import and export, and (*b*) sea freights adversely affect the prosperity of the Indian cultivator ? If so, have you any recommendations to make ?

22. Co-operation.

(*a*) What steps do you think should be taken to encourage the growth of the co-operative movement—

(*i*) by Government,

(*ii*) by non-official agencies ?

(*b*) Have you any observations to make upon—

(*i*) Credit societies ;

(*ii*) Purchase societies ;

(*iii*) Societies formed for the sale of produce or stock ;

(*iv*) Societies for effecting improvements—*e.g.*, the digging of wells and the construction of bunds, walls and fences, or the planting of hedges ;

(*v*) Societies formed for the aggregation of fragmented holdings and their redistribution in plots of reasonable size ;

(*vi*) Societies for the co-operative use of agricultural machinery ;

(*vii*) Societies for joint farming ;

(*viii*) Cattle breeding societies ;

(*ix*) Societies formed for any purpose connected with agriculture or with the betterment of village life, but not specified above ?

(*c*) Where co-operative schemes for joint improvement, such as co-operative irrigation or co-operative fencing or a co-operative consolidation of holdings scheme, cannot be given effect to owing to the unwillingness of a small minority to join, do you think legislation should be introduced in order to compel such persons to join for the common benefit of all ?

(*d*) Do you consider that those societies of which you have personal knowledge have, in the main, achieved their object ?

23. General Education.

(*a*) Do you wish to make observations upon existing systems of education in their bearing upon the agricultural efficiency of the people ? If you make suggestions, please distinguish, as far as possible, between—

(*i*) Higher or collegiate,

(*ii*) Middle school, and

(*iii*) Elementary school education.

(*b*) (*i*) Can you suggest any methods whereby rural education may improve the ability and culture of agriculturists of all grades while retaining their interest in the land ?

(*ii*) What is your experience of compulsory education in rural areas ?

(*iii*) What is the explanation of the small proportion of boys in rural primary schools who pass through the fourth class ?

24. Attracting Capital.

(*a*) What steps are necessary in order to induce a larger number of men of capital and enterprise to take to agriculture ?

(*b*) What are the factors tending to discourage owners of agricultural land from carrying out improvements ?

25. Welfare of Rural Population.

(*a*) Outside the subjects enumerated above, have you any suggestions to offer for improving hygiene in rural areas and for the promotion of the general well-being and prosperity of the rural population ?

(*b*) Are you, for instance, in favour of Government conducting economic surveys in typical villages with a view to ascertaining the economic position of the cultivators ? If so, what, in your opinion, should be the scope and methods of such enquiries ?

(*c*) If you have carried out anything in the nature of such intensive enquiry, please state the broad conclusions which you reached.

26. Statistics.

(*a*) Do you wish to make suggestions for the extension or improvement of the existing methods of—

(*i*) ascertaining areas under cultivation and crops ;

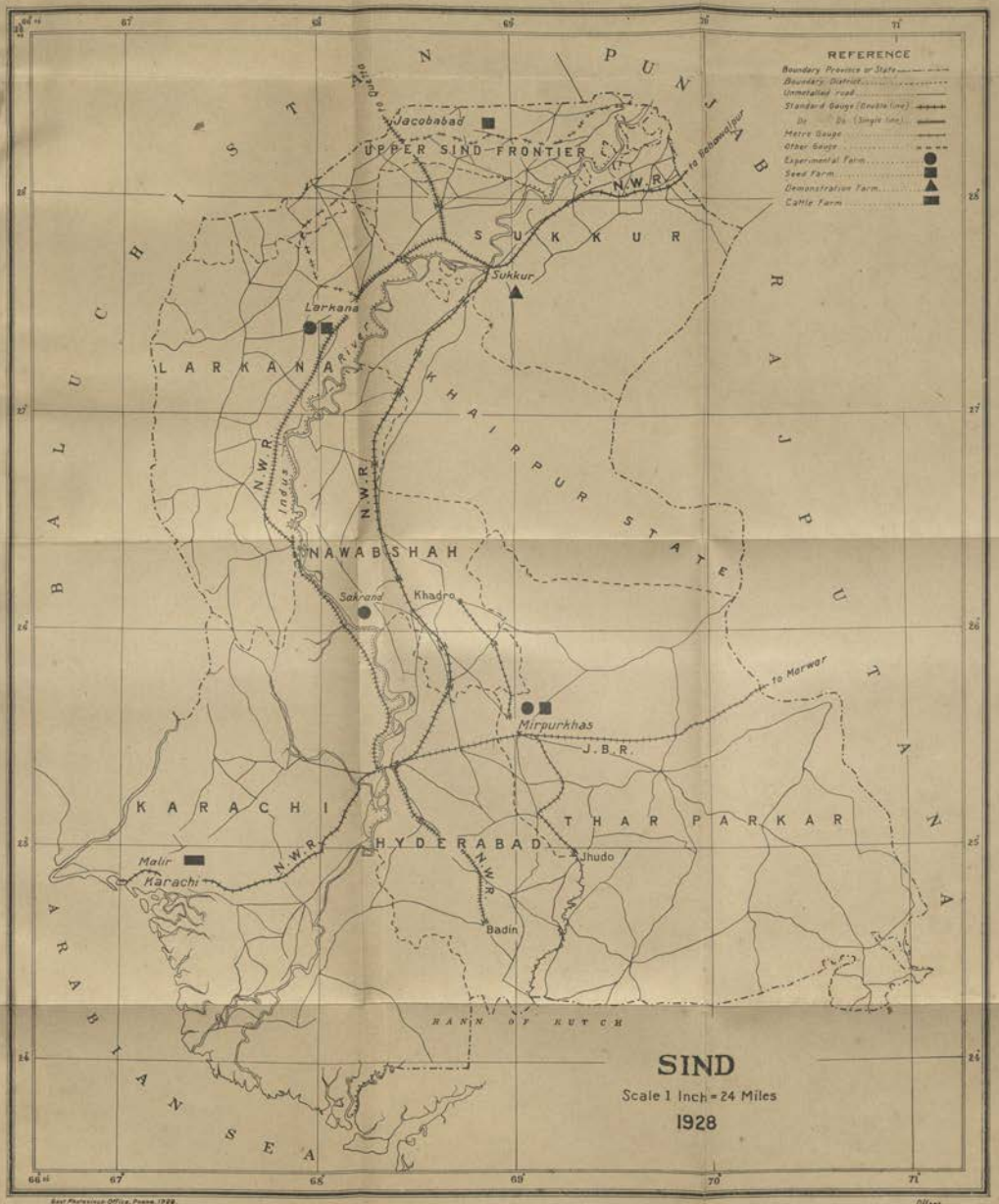
(*ii*) estimating the yield of agricultural produce ;

(*iii*) enumerating livestock and implements ;

(*iv*) collecting information on land tenure, the incidence of land revenue and the size of the agricultural population ;

(*v*) arranging and publishing agricultural statistics ?

(*b*) Have you any other suggestions to make under this heading ?



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SIND

1. GENERAL FEATURES

The Province of Sind, lying between 23° and 28° north latitude, forms the extreme north-western portion of the Bombay Presidency and consists of the lower valley and the delta of the Indus. It is bounded on the north by the Punjab and the Bhawalpur State; on the east by Rajputana; on the south by the Rann of Cutch and the Arabian Sea; and on the west by Baluchistan. The province, excluding the State of Khairpur, consists of seven British districts and covers an area of about 47,000 square miles.

The soil of the province is almost entirely alluvial, having been formed by the detritus of the Himalayas carried down by the river Indus from which it takes its name. For much of its length in the alluvial plain, the river bed is most unstable and the river prone to alter its course, sometimes by many miles, in a single flood season. There are traces of ancient river beds in many parts of the tract, and the Indus is known in past ages to have discharged its waters into the sea at a point about 200 miles east of its present mouths. For about five months in the year the level of the river rises above that of much of the surrounding country and thus enables the water to be drawn off for irrigation by canals which take off from the main river at points where its banks have for long been stable. To the west, the level valley of the Indus is bounded by the Kirthar Range of mountains which separates Sind from Baluchistan; this range has an average elevation of 2,000 ft. with some peaks rising to 7,000 feet. The hills are stony and barren but support a characteristic vegetation and afford grazing to large herds of cattle, sheep and goats.

The forests which consist mainly of *babul* (*Acacia arabica*) fringe the banks of the river for 300 miles.

The finest and most productive region lies in the neighbourhood of Shikarpur and Larkana in a long, narrow stretch extending 100 miles from north to south, enclosed on the one side by the river Indus and on the other by the hills of Baluchistan. Another great alluvial tract with an average width of 70 to 80 miles stretches eastward from the Indus. Sandhills abound near the eastern border, and large tracts remain sterile for want of irrigation.

The soil of Sind consists of a plastic clay strongly impregnated with salts and is remarkably fertile under irrigation.

No soil survey of the province has been made. But five types of soils are usually distinguished: (1) *wariasi*, loose sand fit only for melon cultivation, (2) *kacha*, land resulting from recent inundation, (3) *chiki* or *paki*, hard black soil which has been under water for some time and which is usually very stiff and heavy to work,

(*4*) *rao* or *raewari*, soil enriched by the detritus of hill torrents, and (5) *dasar*, a term widely used for soft or light coloured but productive soil. Besides these, there is also the *kallar* or salt-affected land.

Owing to the absence of monsoon rainfall, the climate of Sind ranks amongst the hottest in India. On the coast, sea-breezes render it equable but, in northern Sind, variations of temperatures are extreme. For the whole province, the average mean temperature of the summer months is 95° and that of the winter months 60°. In the north, the summer maximum frequently rises to 114° and occasionally to 125°; while in the winter, frost occurs at night and, even in the day time, the temperature falls to 40°. Nowhere in India is the hot weather so prolonged.

The rainfall of Sind is very scanty and irregular; in some years, there may be no rain, and in others cyclonic storms may bring 16 inches in a day. The average is about 8 inches. Except in the two areas noted below, cultivation depends not upon the rainfall, but upon the river Indus. These areas are the hilly tract of Kohistan on the west, and the tract to the south-east of the province known as the Thar desert. These tracts are above the river valley and cannot be reached by canals; rainfall is uncertain and the cultivation is most precarious. The inhabitants are chiefly nomadic cattle and camel breeders, and, to them, agriculture is only a subsidiary industry.

The height and duration of the inundation of the river is dependent on the melting of the snows in the Himalayas and on the rainfall in the Punjab, and varies greatly. If the river remains high from May to September, a bumper harvest may be reaped over an area of 4·5 million acres. If the river fails, as it did in 1918-19, the area falls to 2·75 million acres and the outturn is very poor.

The most important crop in Sind is rice (1,000,000 acres). The next in importance is *bajri*, which covers almost the same area. The other important food crops are *juar* (600,000 acres), wheat (500,000 acres), and gram (200,000 acres). Amongst non-food crops, cotton was cultivated last year in 326,000 acres and oil-seeds in about the same area. During the decade, 1911-21, the minimum annual value of the crops in the whole of Sind was, according to an estimate made by the Agricultural Department, Rs. 11 crores in 1918-19 and the maximum Rs. 24·5 crores in 1916-17. The relative importance of the chief crops of Sind is shown by the diagram which precedes page xiv.

Rotation of crops is little practised in Sind. Large areas are kept fallow every year. The area privately owned but not cultivated exceeds the net cropped area. Government waste land including forest forms two-thirds of the entire area of the province and of this about a third is culturable waste.

A census of cattle is taken every five years; the following Table gives a summary of the results of the last five censuses :—

No.	Details	1905	1909	1915	1919	1924
		No.	No.	No. (*Figures in 000's*)	No.	No.
1.	Plough cattle	551	582	601	554	582
2.	Breeding Bulls	8	10	8		22
3.	Cows	537	717	705	617	702
4.	She-buffaloes	223	282	283	259	329
5.	Cattle for other purposes	390	515	581	390	600
	Total cattle ..	1,709	2,106	2,178	1,820	2,325
6.	Total horses	78	84	81	71	79
7.	Total sheep	302	424	514	564	624
8.	Total goats	969	1,074	1,101	1,028	1,511
9.	Total camels	113	116	117	117	169

The decrease in the census of 1919 was due to the removal of cattle to other regions owing to the absence of grazing in the rainless year of 1918-19. One noticeable feature is the large proportion of milch cattle and cattle for other purposes. The Sindhi drinks milk in large quantities, and when suffering from dyspepsia finds a remedy in camels' milk. The desert and unirrigated parts of Sind are pastoral tracts in which the keeping of cattle is the principal occupation of the population.

According to the last census, there were in 1924, 13 plough cattle, 25 milch cattle, and 13 cattle for other purposes for every 100 acres cropped. Throughout the province, the general condition of the cattle is good.

2. PROVINCIAL INCOME

GOVERNMENT OF

(Figures are in

Revenue and Expenditure

Revenue Receipts

Receipt heads	1921-22	1922-23	1923-24	1924-25
Revenue Receipts				
Principal Heads of Revenue—				
Land Revenue	144·2	83·5	72·1	62·0
Excise	31·0	35·5	40·3	39·1
Stamps	16·0	19·4	20·2	19·8
Forest	8·0	6·2	6·3	6·9
Registration	1·8	1·6	1·5	1·5
Scheduled taxes	....	....	0·2	0·6
Irrigation—				
Works for which Capital accounts are kept. (Net receipts after deducting working expenses.)	24·0	36·5	39·3	39·2
Works for which no Capital accounts are kept	0·5	0·5	0·1	0·1
Interest	1·7	3·6	2·7	1·8
Civil Administration—				
Administration of Justice	1·5	2·1	1·9	1·8
Jails and Convict Settlements	0·8	0·8	1·0	1·2
Police	0·2	0·3	0·2	0·4
Education	0·7	1·0	1·0	1·5
Medical	0·2	0·4	0·4	0·3
Public Health	....	0·1	0·1	0·2
Agriculture (including Veterinary and Co-operation).	0·4	0·4	0·7	0·7
Miscellaneous Department	0·1	....	0·1	0·1
Civil Works	0·5	0·9	0·7	0·9
Miscellaneous	1·8	2·2	3·2	2·6
Total ..	185·4	195·0	192·0	180·7

N. B.—1. As there is no separate budget for Sind, the above figures have been extracted from
2. Figures for Capital Receipts in Sind are not available.

AND EXPENDITURE

BOMBAY (SIND) •

lakhs of rupees)

charged to Revenue

Expenditure heads	1921-22	1922-23	1923-24	1924-25
	Expenditure charged to Revenue			
Expenditure charged to Revenue				
Direct Demands on the Revenue—				
Land Revenue	23·0	40·1	39·2	13·8
Excise	2·5	1·3	1·3	1·9
Stamps	0·7	0·9	0·8	0·7
Forest	4·2	3·5	3·6	4·1
Registration	0·8	1·0	0·9	0·9
Irrigation—				
Works for which Capital accounts are kept	11·4	12·9	16·2	21·5
Miscellaneous Irrigation Expenditure ..	38·2	23·1	13·5	23·1
Civil Administration—				
General Administration	14·3	20·7	19·6	44·8
Administration of Justice	10·0	9·6	10·0	11·5
Jails and Convict Settlements	6·3	5·9	5·2	5·9
Police	40·8	36·1	35·1	36·0
Ports and Pilotage	0·1	0·1	0·1	0·3
Education	23·4	23·0	26·6	23·8
Medical	5·9	4·6	5·3	5·3
Public Health	3·1	3·5	2·9	2·9
Agriculture (including Veterinary and Co-operation.)	3·5	3·3	3·3	3·4
Miscellaneous Departments	0·3	0·3	0·3	0·3
Civil Works	22·2	10·4	6·5	8·0
Miscellaneous—				
Superannuation Allowance and Pensions ..	5·9	6·1	6·9	7·1
Stationery and Printing	1·2	1·3	0·9	1·0
Miscellaneous	1·5	1·3	4·0	5·2
Total ..	219·3	209·0	202·2	221·5
CAPITAL EXPENDITURE				
Capital Expenditure in Sind				
Construction of Irrigation Works ..	5·6	19·1	51·5	124·0
Capital Outlay on Improvement in Public Health.	....	5·3	0·5	....
Civil Works not charged to Revenue	....	7·1	5·5	12·2
Total ..	5·6	31·5	57·5	136·2

the budgets for the Presidency of Bombay.

3. REVENUE ADMINISTRATION AND LAND RECORDS

Sind is a province of the Bombay Presidency and is under a Commissioner, who has considerably larger powers than those of an ordinary Commissioner of a division. Under certain Acts he has the powers of a local government, whilst under others he has powers which in the rest of the presidency are exercised by heads of departments. There are seven districts in Sind, of which six are under Collectors and one under a Deputy Commissioner. The Collector or Deputy Commissioner is in charge of the revenue administration of the district and, is also the chief magisterial authority, and the district registrar. For each taluka in the collectorate, there is an officer called the *mukhtiarkar* who, in addition to his revenue duties, is in charge of the sub-treasury and exercises magisterial powers. An assistant or deputy collector is in charge of a revenue sub-division comprising several talukas. The collection of the land revenue is performed by the *tapedars*, each of whom is responsible for a group of villages which varies in number from five to ten. Between the *mukhtiarkar* and the *tapedar* there is a staff of inspecting officers known as supervising *tapedars*, of whom there is one to every four or five *tapedars*. The Manager of Encumbered Estates is an officer of the Indian or the Provincial Civil Service. He is appointed under the Sind Encumbered Estates Act, which was passed to provide relief to *jahagirdars* and *zamindars* in debt. The management of their estates is undertaken by the Manager upon an application by the landholders.

The functions of the Land Records Department are to provide statistics necessary for sound administration in all matters connected with the land, to reduce and simplify litigation in the revenue and civil courts, to provide a record of rights for the protection of all who have interests in land, and, lastly, to simplify and cheapen periodical settlement operations. A branch of the provincial Land Records Department is located in Sind and is under a Superintendent of Land Records. The work in the district is carried on by district inspectors, *tapedars* and supervising *tapedars*. Control over the district staff is exercised by the Collectors, the functions of the Superintendent of Land Records being limited to inspection and advice. A complete record of rights and interests in land has been prepared for the unalienated villages in the province except the Kohistan tract of the Karachi district and the desert tract of the Thar and Parkar district, and has proved of great value to the public.

Before the advent of the British in 1843, the land revenue was levied in kind as a share of the produce. The system was continued for some time but payment in cash was introduced at an early date. Later, a survey and settlement on the lines of what had been adopted in the Bombay Presidency was introduced in Sind, but had to be altered to suit the special conditions of a province where a large part of the land is left fallow every year. The assessment is fixed by the method known as irrigational settlement. In this settlement, the villages of a taluka are divided into groups arranged in accordance with the facilities which they enjoy for

obtaining water and for the disposal of produce at a market. Rates are then prescribed for the different methods of irrigation in each group of villages. The pitch of the assessment is governed by the trend of prices, the value of land, and the state of the canals. This system has the merit of leaving the occupant the choice of the best method of irrigation, season by season, suited to the height of the river and the water-supply available. Assessment is levied on each survey number only when it is cultivated; the size of the number has been reduced to the area cultivable with one pair of bullocks. No assessment is collected on lands which are not cultivated, but to prevent the land lying idle, a fallow assessment is charged once in five years. The period of settlement is normally fixed at twenty years, except in areas where important irrigational projects are under consideration or which are particularly exposed to the vagaries of the river.

There are few tenant rights in existence. The bigger zamindars cultivate the lands through *haris* who are tenants-at-will and usually pay rent in kind. The smaller zamindars cultivate themselves.

4. THE CULTIVATOR

The census of 1921 gave Sind a population of 3,280,000 which was only slightly in excess of the population of 1901. There had been an appreciable increase between 1901 and 1911 but this increase was wiped out by the influenza epidemic of 1918 which took a great toll of life in Sind, especially in rural areas. The decrease in rural population between 1911 and 1921 was highest in the Karachi district, (14·7 per cent), and lowest in the Nawabshah district, (6·6 per cent).

There are 27 towns in Sind and 5,107 villages. The province is sparsely populated, the average number of persons per square mile being 71. Of the population 2·4 millions or 75 per cent are Muhammadan and 800,000 or 25 per cent are Hindus. If the population is classified by occupation we find that 1·9 millions are landholders and tenants or agricultural labourers and their families. The non-agricultural population is 1·4 millions. The agricultural population can be divided into three classes, (1) the big zamindars, a small but very influential class, (2) the small zamindars or peasant proprietors and (3) the *haris* or ploughmen who have no direct interest in the land.

The number of holdings in Sind is about 220,000. Their size and distribution is shown in the following table:—

1.	Under 5 acres	68,819
2.	Between 5 and 25 acres	93,959
3.	„ 25 „ 100 „	42,015
4.	„ 100 „ 500 „	11,596
5.	Over 500 acres	2,251

The total area in these holdings is a little over 8 million acres; the average area of the holding is 38·7 acres and the average assessment per

holding about Rs. 54. The proportion of holdings in each class varies from district to district. The Upper Sind and the Thar Parkar districts have large estates. In Larkana and Sukkur, the proportion of large landholders is very small, but in the former they hold a considerable proportion of the land.

The *hari* is a tenant who pays rent usually on a share basis, the share being half the crop on flow land and one-third of the crop on lift land. He is, as a rule, financed by the landowner himself, who also directs what is to be grown and how it is to be grown, while the *hari* provides his own men, bullocks and implements.

The problem of the consolidation of holdings was investigated but it was found that the evil of fragmentation does not exist in Sind to any large extent and that as large areas of land are still available, the problem has not yet become important.

In years of good inundation, the economic condition of cultivators in Sind is favourable. They are not so well off in the delta, as the region is malarial. The position of the farm labourer has improved very much in recent years, as there is a greatly increased demand for labour. The extension of peasant proprietorship under the Sukkur Barrage system will also benefit men who have the necessary industry and ambition to take advantage of the new conditions.

The staple food of the agrarian classes is either *juar* or *bajri*, except in the delta and the rice-growing parts of the north where rice is generally used. The consumption of wheat is increasing. All classes, except a few Hindus, eat flesh, fowl and fish. The ordinary villager lives in a low hut consisting of mud walls and a roof of thatch, with a hedge round it. Large sections of the people, however, especially in the delta, live in movable shelters of brushwood and thatch. The house of the zamindar is built of dry bricks and with a flat roof, and is usually surrounded by a wall enclosing the court-yard.

The Sindhi is very hospitable and inclined to improvidence in his expenditure; and, in consequence, large numbers are in debt. Where there are no co-operative societies, the cultivator resorts to a *bania* who is both a shopkeeper and a moneylender. He advances to the cultivator whatever he requires on condition that the crop is brought to him for disposal. Wherever the co-operative movement has taken root, the cultivator is being freed from this incubus and is becoming independent. The cultivators have ample leisure after their agricultural operations are over; but are reluctant to leave their villages and go to towns to seek employment. Occupations, such as the care of livestock, goats, sheep and cattle are largely in the hands of special classes. For large works, labour has often to be imported from outside Sind. When the Sukkur Barrage is completed in 1931, and the irrigational system under it developed during the next generation, irrigation will be available for the whole year over the greater part of Sind instead of for four months, and full employment will thus be available for a large proportion of the population.

5. THE AGRICULTURAL DEPARTMENT

The department in Sind is an integral part of the Department of Agriculture in the Bombay Presidency and is, therefore, under the control and guidance of the Director of Agriculture, Poona. Work in connection with agricultural problems in Sind began with the establishment of an experimental farm at Hyderabad in 1884, when experiments were made with American cotton and the Egyptian date palm; the distribution of wheat and rape seed in the Nara Valley was also commenced. Very little headway was, however, made until 1903 when the construction of a perennial canal (the Jamrao Canal) suggested the possibility of growing long staple cotton and experiments were also undertaken with wheat, *berseem* and the irrigation systems in vogue.

In 1906, a special officer was appointed to carry out investigations into Sind conditions and especially to study the problems of cultivation of Egyptian cotton. This led, in 1907, to the appointment of a deputy director of agriculture for Sind. Since then, work has developed in several directions. Excluding the lower grades of assistants and the special staff employed in connection with the experimental work undertaken in view of the Sukkur Barrage, to which reference is made below, the staff now consists of—

(1) one deputy director of agriculture;

(2) one botanist. Although he is designated cotton breeder, he is also in charge of rice breeding and wheat breeding;

(3) a divisional superintendent of agriculture who is in charge of work in east Sind; and,

(4) thirteen graduate assistants.

The Livestock Expert for the Bombay Presidency has control of a farm in Sind for the maintenance and improvement of the red Sindhi or Karachi breed of cattle. Sind can also indent on the services of expert officers of the Bombay Government, such as the Agricultural Chemist, Economic Botanist, etc.

The main lines of experimental work have been the following:—

(1) *The introduction of long staple cottons.*—Attempts to introduce Egyptian varieties have for the present been abandoned; and attention is now concentrated on the introduction of American cottons. The two Punjab types, 4 F. and 285 F. have now been introduced on a large scale, especially in the Jamrao area. These are high yielding cottons, but the cotton breeder in Sind has succeeded in isolating still higher yielding strains from the general Punjab stock. These Punjab and American cottons are being multiplied as fast as possible; and it is hoped that Sind will shortly be self-dependent in the matter of American cotton seed.

(2) *The improvement of Sind* deshi *cotton by selection.*—Of the several strains isolated during the last few years, the variety known as 27 W. N. has been selected for distribution and has become popular.

(3) *The improvement of wheat.*—Here the work being done is the introduction of Pusa and Punjab wheats as well as the development of high yielding strains of Sind wheat. Pusa 12 has become the standard type of wheat in upper Sind. Two new strains have, however, now been evolved which are doing even better than Pusa 12. It is now possible to recommend different varieties and improved strains of wheat for different parts of Sind, and these have already become very popular. A wheat seed farm is maintained at Jacobabad.

(4) *The improvement of rice.*—Experimental work on rice has been recently taken up ; and early and more prolific types have now been isolated which, on experimental areas, give an increased yield of 20 to 30 per cent. These are now being tried on a large scale in cultivators' fields.

(5) *Work on agricultural implements.*—Agricultural implements used in Sind are generally very crude. An appreciable advance has now been made by the department in the introduction of the Egyptian plough and various types of implements of economic value.

The establishment of the Sukkur Barrage canal system will revolutionise the character of the agriculture in Sind. When the scheme is completed, the cropped area in Sind will be increased by two to three million acres annually, and cropping will be possible throughout the year. New and difficult problems will arise when perennial irrigation is introduced into a country which has hitherto been watered only during a small part of the year. The Government of Bombay, therefore, appointed, in 1923, a committee to make suggestions as to the best way in which such problems should be tackled. The committee recommended the starting of experimental work at once under the best and most scientific direction obtainable and the finance thereof on a liberal scale ; and, in particular, (*a*) the establishment of three first class experimental stations : one on the right bank of the Indus, preferably at Larkana, another on the left bank of the Indus at Sakrand, and a third at Shadipalli for the Eastern Nara tract ; (*b*) the establishment of five subsidiary stations ; (*c*) experimental work on fruit culture and cattle breeding ; (*d*) larger expenditure on propaganda, the provision of higher agricultural education in the province itself, and the separation of the Agricultural Department in Sind from that of the presidency proper, the former being placed under the sole control of a local Director of Agriculture. The total capital cost of this scheme is estimated at Rs. 7,69,000 ; and the recurring cost, Rs. 4,10,000. The Government of Bombay accepted the recommendations with certain reservations but have not yet succeeded in finding the finance necessary. For the present, provision has been made only for the new experimental station at Sakrand with a Director and a botanist, a soil physicist and chemist, a horticultural expert and six graduate assistants under him ; and also for an agricultural engineer for Sind. The land at Sakrand is typical of large areas in the country. The problems which the station is required to solve are mainly three ; (1) to determine what crops can most profitably be grown under Barrage conditions in

central Sind, and to breed types of such crops; (2) to find the best way of using the water in the prevailing conditions and (3) to find out the effect of perennial irrigation on the soil. Experimental work on all these problems was started at the station in 1926.

Demonstration and propaganda.—Two difficulties in the way of introduction of agricultural improvements in the past have been the illiteracy of the people and the want of proper finance. The close co-ordination of the departments of Agriculture and Co-operation in Sind is helping the solution of the question of finance. Since 1922, the carrying out of agricultural propaganda in northern and central Sind has been entrusted to the Assistant Registrar. The general control of the work is in charge of a divisional board composed of six members of whom four are non-officials and two officials—the Deputy Director of Agriculture, and the Assistant Registrar. Taluka development associations have been particularly successful in Sind, and there are fourteen such associations now in existence. They have demonstrated the value and extended the use of improved seed, implements, and modern methods of cultivation, have distributed large quantities of cotton and wheat in many areas, and are becoming an essential part of agricultural propaganda in the country.

Agricultural education.—As there is no provision for the imparting of higher agricultural education in Sind, scholarships have been given since 1907 to enable students from Sind to go to the Poona Agricultural College. Selections are made by the Commissioner, and each scholar signs a bond that he will work in the Agricultural Department for five years after graduation if his services are required by the department. From 1918 to 1922 these scholars were sent to the Punjab Agricultural College at Lyallpur instead of to Poona; but since 1923, the scholarships have again been transferred to Poona, as the Punjab authorities demanded the full cost of their training. The number of scholarships awarded at present is six per annum. Besides these scholarship-holders, there are a few private students from Sind at the Poona Agricultural College.

In 1912, a school for imparting vernacular agricultural education to boys belonging to cultivating classes was opened at Mirpurkhas with the object of enabling them to improve their own lands, to manage the estates of zamindars, or to enter agricultural service. The school never became popular and was closed in 1922. Since 1924 nine agricultural bias schools have been opened in Sind.

The cost of the department in Sind last year was Rs. 1,55,908. This is exclusive of the cost of the Sakrand farm, for which the amount budgeted was Rs. 1,35,000.

Livestock—Cattle breeding and dairying.—Sind is the home of three breeds of cattle of considerable merit:

(1) the Red Sindhi or Karachi, the best milking breed in India;

(2) the White Sindhi or Thar Parkar, a good milker and an efficient draught animal;

(3) the Bhagnari from the borders of Baluchistan, one of the best draught breeds in India.

The department has started a farm close to Karachi for the maintenance and breeding of the Red Sindhi. This farm contains the best milking stock in the country. A few Thar Parkar animals also are kept on it but a proposal is under consideration to start a separate farm for that breed in the Thar Parkar country. There is no provision for a similar provision for the Bhagnari breed of cattle. A small herd of Murrah or Delhi buffaloes is kept at Sukkur.

Cattle breeding in Sind is under the control of the Livestock Expert who works in co-operation with the Deputy Director of Agriculture. Premium bulls are given out by the department to selected cultivators on certain conditions and this system is now specially used for the provision of good Bhagnari bulls in upper Sind.

6. THE VETERINARY DEPARTMENT

The Veterinary Department in Sind is independent of the department in the Presidency. Sind has a separate Superintendent who is also in charge of Rajputana. His staff consists of two veterinary inspectors and 21 assistant surgeons, 18 of whom are in charge of dispensaries and 3 are on reserve duty. Of the 18 assistant surgeons in charge of the dispensaries, one is a local board servant.

The number of veterinary dispensaries is 18; the total number of patients treated at these dispensaries last year was about 26,500; medicine and advice were also given in the case of 3,800 other animals not brought to the dispensaries. The dispensaries are under the control of the district local boards, the assistant surgeons in charge being supplied by Government.

Besides supervising the work of the dispensaries, the Veterinary Department is also engaged in the prevention and cure of contagious diseases, among which rinderpest is the most common. Other prevalent diseases are foot-and-mouth disease and hæmorrhagic septicæmia. Anthrax and black-quarter also occur at times. The number of animals inoculated in 1926-27 was nearly 13,000.

The Veterinary Department in Sind also supervises horse breeding operations. There are 9 stallions in the province towards whose maintenance Government contributes half the cost.

The total cost of the department for last year was about Rs. 1,84,000 out of which Rs. 90,000 came from provincial revenues and Rs. 94,000 from the local authorities. The latter amount includes a sum of Rs. 24,000 paid by the Wadia Trust.

7. IRRIGATION

Practically the whole cultivation in Sind depends on irrigation by canals from the river Indus. The inundation of the river, which begins in May and subsides in September, depends on the melting of the snows in

the Himalayas and to a large extent upon the rainfall in the Punjab and the consequent accretions to the Indus flood from the five tributaries of the Punjab. The water carried by the river varies from 20,000 cusecs in February to 950,000 cusecs in August. The water is gauged at several points and when the level reads above 13 feet at Bukkur and 17 feet at Kotri for the greater part of the three months June, July and August, the canals receive an adequate supply. If the level of the river rises to this height in May and does not fall below it till September, the cultivating season is prolonged and the harvest is bountiful, but such years are rare.

For some 400 miles from Kashmor in the north to below Tatta in the south, the river is confined by almost continuous earthen embankments; the height of these embankments varies from ten to twenty feet according to the height of the bank of the river; it is only at rare intervals that the bank is so high as to require no embankment. When the river level rises above 16 feet at Bukkur or 22 feet at Kotri, there is serious danger of breaches in the embankment and of grave damage by flood. As the Indus runs through soft alluvial sand in most places it is liable to change its course by several miles in rapid movements and the task of protecting the embankments calls for constant vigilance and involves heavy expenditure by the State. These embankments have been constructed and gradually improved and strengthened in the last fifty years : at dangerous points, the earth wall is faced with brick or stone.

The system of irrigation from inundation canals existed before the British assumed control of Sind in 1843. These canals have been continuously extended and improved and new canals have been constructed so that, at the present date, 7,925 miles of canals are under the administration of the Irrigation Department. The supply of water is controlled by masonry head works. For the most part, the water runs on a higher level than the surrounding fields and flows on to them through distributaries which are also controlled by masonry outlets. Dams and regulators are constructed at suitable intervals to raise the height of the water in the canals. In certain tracts, particularly in the centre of Sind on the left bank, the land is higher than the canals and the water has to be raised by lift. The method commonly adopted is that of the Persian wheel worked by bullocks or camels.

In order to guard against the erosion of the embankments, a channel several miles wide has been left for the swings of the Indus and, in this tract, considerable areas are cultivated on the moisture left in the soil after the subsidence of the inundation. These are the winter crops, wheat, oil-seeds and pulses. Of the total present cultivation of Sind, 72 per cent is *kharif* and 28 per cent is *rabi*.

The irrigation system in Sind is now in process of being converted from an inundation to a perennial basis by the construction of the Sukkur Barrage and of a new system of canals which will run from the Sukkur Barrage on both sides of the river; on the right bank to the west for 132 miles until the Kohistan hills interpose a barrier close to Sehwan; on the left bank to the east over 205 miles

past Hyderabad to the Rann of Cutch and to the elevated sand-hills of Thar Parkar. It is estimated that this scheme will alter the irrigation of two-thirds of the present irrigated area of Sind, rendering water available for the whole twelve months of the year instead of for the short inundation period of four months. The system will also supply water by flow to large tracts now irrigated at considerable expense by lift. It will also provide water to 3·5 million acres which now have no available supply for irrigation. The area commanded by this scheme is 7·5 million acres, of which it is anticipated that 5·5 million acres will eventually be cultivated annually. This area of 5·5 million acres cultivable by this scheme exceeds the present culturable area of Egypt by 500,000 acres.

The project is estimated to cost nearly Rs. 20·25 crores, of which 5·5 crores are debited to the Barrage and 14·75 crores to the new canals. The Barrage is located three miles below the gorge of the river Indus between Sukkur and Rohri. It is to be equipped with movable gates which will be raised when the inundation rises and will be lowered when it falls so that the level of the water may be retained at a height sufficient to fill the canals which take off above the Barrage. It is anticipated that with the supply of water throughout the year the cultivating season will be largely altered and two-thirds of the area will be brought under crops in the winter season and one-third in the summer season. The cultivating season for cotton will be prolonged from four months to eight months, enabling the substitution of long staple cotton for the less valuable short staple varieties. It is also anticipated that wheat and oil-seeds will also be substituted for the less valuable crops of millet, while the area under rice will remain unchanged. The main difficulty of the cultivator at the present time is the lack of employment for many months of the year and it is hoped that, in this tract, this difficulty will be wholly relieved.

The plain of Sind is so level, having an average slope of six inches to the mile from north to south, that there are few natural drainage channels; and the problem of supplying drainage in conjunction with the new irrigation scheme is receiving the attention of the engineers.

8. FORESTRY IN RELATION TO AGRICULTURE

The area in charge of both the Forest and Revenue departments is only 1,171 square miles. The forests which are situated along the banks of the Indus run in narrow strips from a quarter of a mile to two miles in breadth. They are liable to erosion and are seriously affected by changes in the course of the Indus.

The indigenous trees consist of *babul* (*Acacia arabica*), *kandi* (*Prosopis spicigera*), *bahan* (*Populus euphratica*) and two kinds of tamarind. A valuable tree, sometimes found, is the *tali* (*Dalbergia sissoo*).

Babul trees produce wood suitable equally for building, fuel and ploughs; seed pods useful for feeding cattle; bark for tanning; and leaves and thorns as a favourite fodder for camels and goats; and

within the limits of central Sind are a host for the lac insect. *Bahan* yields light soft wood for building purposes.

The number of cattle admitted to grazing in the forests in 1925-26 was nearly 100,000, equally divided between horned cattle and sheep and goats. About 2,000 camels were also admitted to browsing. The average expenditure on the forests in Sind for the last quinquennium came to Rs. 3·75 lakhs, while the revenue was Rs. 6,85,000.

Besides the State-owned forests mentioned above, it is not uncommon in Sind for zamindars to have private groves of their own. These are known as *huris* which are well preserved and are a source of appreciable profit to their owners.

9. GENERAL EDUCATION

Educationally, Sind is very backward : the percentage of literacy for all communities is 4·1 only ; but in the case of Muhammadans it goes down to 2·7 and amongst the advanced communities rises to 12·6. The fact that the population is widely scattered is a great obstacle in the spread of literacy. The main reason, however, is the general apathy to education of the Muhammadans who form three-fourths of the total population. Recently, however, this community has shown greater interest in educational matters, and more rapid progress may be expected in the near future.

The educational system in the province is identical with that of the presidency proper. The superior staff of the department in Sind consists of an educational inspector, an inspectress for girls' schools, a senior deputy inspector for each district except Thar and Parkar where there is a deputy inspector and a special deputy inspector for Urdu and Mullah schools.

The changes in the administration of primary education which have been made by the Primary Education Act of 1923 have been described in the introduction to the volume of evidence for the presidency proper. All the district local boards in Sind, with one exception, have taken over the control of primary education in accordance with the terms of the Act.

Institutions for higher education are confined to :—

(1) two arts colleges at Karachi and Hyderabad ;

(2) a special Medical School at Hyderabad, where men are trained for the subordinate medical service ;

(3) an engineering branch of the Arts College at Karachi ; and

(4) a Law College at Karachi.

Sindhi students also attend the institutions in the presidency proper.

The total number of students in primary schools last year was a little over 100,000, of whom girls numbered one-fifth. Thus about 21 per cent of the school-going population was at school. There is the same wastage in primary schools in Sind as in the other parts of the presidency, the attendance falling rapidly in the upper classes. Of 100 students

attending primary schools, less than nine reach the upper primary (vernacular middle) standards.

As Sind is predominantly a Muhammadan province, special reference may be made to education amongst that community. The number of Muhammadan pupils receiving instruction in Sind last year was 66,818 of whom about 17 per cent were girls. Fifty-four thousand of these were in primary schools, 2,700 in secondary schools, 86 in colleges and 365 in special and training schools. Of the students in primary schools, about 36 per cent were in Mullah schools, in which, under the control of religious teachers, religious instruction as well as secular is given to Muhammadan boys. These schools are recognised by the State and receive grants graduated according to their efficiency. There are now 724 of these schools, and the grants-in-aid amounted to Rs. 3·25 lakhs. The expenditure on Muhammadan education in Sind was roughly estimated at Rs. 22 lakhs out of which Rs. 12 lakhs were met from the provincial funds. The total expenditure on education in Sind last year was Rs. 50 lakhs out of which Rs. 27 lakhs were contributed from provincial funds.

10. CO-OPERATION

The co-operative movement in Sind is comparatively new. Attempts at the formation of societies started with the passing of the Co-operative Credit Societies Act of 1904. Little progress was, however, made until a separate Assistant Registrar for Co-operative Societies was appointed in 1918. Up to that date, only 65 societies had been organised, which had a membership of about 3,000 and a working capital of Rs. 1,63,000 only. Many of these societies existed only in name and did little work. The Assistant Registrar, on his appointment, carried on vigorous propaganda, secured the co-operation of all classes of agriculturists, revised the constitution of existing societies, and drafted by-laws to suit the existing conditions in Sind. The by-laws were modelled on those in force in the Punjab where conditions were more or less akin to those prevailing in Sind. The chief difference in the constitution of the societies in Sind and those in the presidency proper is that the former are organised on a share basis—a system which is described below.

The difficulties in the way of organising societies were many. The Registrar of Co-operative Societies, in 1917, reported that the societies were still "at too elementary a stage to justify a prophecy that the movement will ever take firm root in Sind." The general illiteracy prevailing in the province, the aversion of the bulk of the population, which is Muhammadan, to the taking of interest, the predominating influence of the big zamindars, and the prevalence on a large scale of the *hari* system under which the cultivator has no direct interest in the land, as well as the absence of big villages were great handicaps in the rapid development of the movement, but since 1918 the movement has developed rapidly in the province. The co-operation of the educated leaders of the people has assisted this development. The number of societies increased from 65 in 1918 to 481 in 1923,

During the same period the membership and working capital increased from 3,000 and Rs. 1,63,000 to 19,000 and Rs. 38 lakhs respectively. At the end of March 1927, the corresponding figures were 863, 39,247, and Rs. 137 lakhs. The results of the working of the movement have been very striking. Not only are members financed for their current needs, but, in a very large number of cases, they have been freed from their debts. Mortgage bonds and conditional sale deeds have been redeemed, habits of thrift have been inculcated, and several members have purchased fresh plots of land out of their savings. Most of the members have severed their dealings with the moneylender altogether. A striking feature in the movement in Sind is the large percentage of owned capital of primary societies and the large amount of share capital of the members, showing how well the lesson of thrift has been inculcated. The by-laws of these societies provide that the minimum holding of each member shall be one share of Rs. 20 payable by yearly instalments of Rs. 2. But from the beginning each member has taken up a substantial number of shares, increasing his contributions from year to year. The result has been that in practice each member holds a considerable number of shares. It is a common thing in a society of five years' standing for a small zamindar to hold Rs. 150 to Rs. 300 and for a *hari* to hold Rs. 100 to Rs. 150 in shares. The reserve fund of the societies now amounts to nearly Rs. 4·5 lakhs. It has reached a substantial figure in the older societies. Some of the societies on the Jamrao Canal now have sufficient owned capital to meet the total needs of all without any outside borrowing.

The co-operative movement in Sind had until recently catered for the needs of the small zamindars only. The big zamindars in Sind, however, are as heavily in debt as the smaller ones. These, in two districts, have now been organised into two zamindari banks on the co-operative model. Although they have been in existence only for two years, these banks have now a working capital of over Rs. 5 lakhs and have been of substantial benefit to their members.

The progress made would have been impossible of achievement, had arrangements for financing the movement through the organisation of central banks not been made. Till 1918-19, the societies obtained finance from the Bombay Provincial Co-operative Bank. Since then central banks have been established in Sind itself. The first to be established was the Central Bank at Karachi. At present not only is there a bank for every district, except the Upper Sind Frontier, but the Karachi Bank, besides acting as a central bank for the district of Karachi, also serves as an apex bank for the whole province. There is now a complete net work of central financing institutions in the province, and there is no difficulty in getting sufficient funds to finance the primary societies. The total working capital of the six central banks in Sind was Rs. 64 lakhs last year.

The ideal of spreading agricultural improvements through co-operative societies has also been fulfilled to a considerable degree in Sind. There are eleven seed societies organised for the distribution of improved

varieties of seed. The main work of improvement, however, has been done through taluka development associations, and the few simple but substantial improvements which the associations have been able to demonstrate have been largely adopted by the members of co-operative societies. Amongst the improvements introduced may be mentioned the distribution of improved varieties of wheat (Pusa 12) and cotton (27 W. N.), the large distribution of the Egyptian plough, and the introduction of the Raja and monsoon ploughs, the Archimedean screw and various clodcrushers. The work of these associations is done almost entirely through members of co-operative societies. They appoint *kamgars* and supervisors to visit villages, to hold demonstrations of improved seed, implements, and modern methods of farming. Experiments are also being made to get the associations and supervising unions to indent for the agricultural and other domestic requisites of agriculturists and to distribute them amongst their members. So far, the experiments have proved very successful.

The whole work is done under the general supervision of the Registrar of Co-operative Societies, by the Assistant Registrar stationed at Hyderabad. He has a deputy working under him and also six auditors. The Assistant Registrar is helped in the work of organisation and supervision by honorary organisers as well as by the supervising unions into which the societies are now being organised. The Bombay Provincial Co-operative Institute has also a divisional branch in Sind, which has been doing valuable work in the way of carrying on co-operative propaganda, holding conferences, and training classes for members, secretaries, and honorary organisers, and conducting a co-operative magazine. District branches of the Institute are also being established.

11. COMMUNICATIONS AND MARKETING

In 1851, Sir Bartle Frere found in all Sind "not a mile of bridged or metalled road, not a masonry bridge of any kind; in fact, not five miles of any cleared road." The sandy nature of the soil, the difficulty of getting metal, the liability to inundation make the construction and upkeep of roads a very difficult and expensive matter; and, in consequence, even now Sind is badly served in the matter of roads. There are no doubt recognised routes by which traffic is carried in the dry season between large towns; *e.g.*, from Karachi to Shikarpur and from Hyderabad to Jodhpur and Multan. These routes, however, were, and still are, mere tracks suited to the camel but bad for wheeled traffic. In north Sind, the use of carts is more common, but in the other parts camels, pack bullocks, donkeys and horses form the usual means of transport. Where carts are used they are very heavy and primitive and are a great strain on the bullocks.

Before the advent of the railway, the river was one of the chief means for the carriage of produce over long distances and it is still used for that purpose. It was under the charge of a special government department known as the Indus Conservancy Department which, however,

was abolished in 1906. It is now under the charge of the Indus River Commission. Although the navigation of the river has engaged the serious attention of Government since the time, nearly a century ago, when it was necessary to use the river for the passage of troops to Multan and Afghanistan, the conservancy of the river really commenced only with passing of the Bombay Act I of 1863 which provided for the registration of vessels and the levy of pilotage fees, the sums so realised to be expended in removing obstructions on the river and improving its navigation.

Sind is now connected by rail with all parts of India and through Baluchistan up to the Afghan and Persian borders. By sea, there are regular services to Bombay and to the Persian Gulf; while passenger steamers leave the port of Karachi regularly for Europe. Karachi is now becoming the port of call for air traffic.

The main arteries of traffic are now the railways, the most important of which is the North Western Railway which connects Karachi with the Punjab. A new broad gauge connection with Delhi through Rajputana is again under consideration. The first railway to be started was on the right bank of the Indus. As this line was frequently breached an alternative line on the left bank was constructed and this has now become the main route to the Punjab. A line was opened from Hyderabad to Badin in 1904, and an extension is now proposed across the Rann of Cutch to meet the Bombay-Baroda and Central India Railway at Viramgam, thus affording through communication, without break of gauge, from Sind to Bombay. At present there is a meter gauge connection from Hyderabad to Ahmedabad by the Jodhpur-Bikaner Railway.

There are a number of feeder lines in Sind which connect important marketing places and carry a large part of the export produce of the country. These are the Hyderabad-Badin, Mirpurkhas-Khadro, Mirpurkhas-Jhudo, Larkana-Shahdadkot, and Jacobabad-Kashmor lines.

Marketing

Crops are ordinarily sold in the field. The trader goes round to collect the cotton, wheat, rice or oil-seeds and brings it by camel load to the nearest market or railway centre. Rice is purchased locally from producers, husked and parboiled in the chief local centres like Larkana, and then exported. A large number of rice mills have now been erected in all the rice growing centres. No grading is done for the internal trade, but traders sometimes grade for their own benefit or under pressure from the ultimate buyers.

The chief hindrances to proper marketing are the bad condition of the roads, the lack of carts, the want of standardised weights and measures, and the lack of storage accommodation.

12. LOCAL SELF-GOVERNMENT

Local self-government in rural areas dates from the year 1884. The proportion of elected and nominated members on local boards was

originally fixed at two-thirds and one-third respectively. The system established by the Local Boards Act of 1923 for the Bombay Presidency holds good for Sind, and the description need not be repeated here. The income of all the boards in Sind in 1925-26 was Rs. 34·25 lakhs, while their expenditure was Rs. 32·5 lakhs. Income from local rates came to Rs. 10 lakhs, the grants from Government amounted to Rs. 16 lakhs of which Rs. 9·5 lakhs was for education, Rs. 50,000 for medical purposes, and Rs. 5·25 lakhs for civil works. The total expenditure on education was Rs. 12·75 lakhs; on hospitals, dispensaries, etc., Rs. 2·75 lakhs; on veterinary charges Rs. 42,000, and on communications Rs. 6·75 lakhs.

The greater part of the revenue is usually spent by the district local board on works of general utility to the whole district; but each taluka local board has funds at its disposal to enable it to carry out and maintain works of purely local utility for which it is primarily responsible. At least one-third of the revenue derived from the one-anna cess must be spent on education.

Local boards are bound, so far as their funds permit, to make adequate provision for education, water-supply, construction and maintenance of roads, hospitals, dispensaries and markets. They have also the discretionary power to spend money on the establishment and maintenance of model farms, the improvement of breed of cattle, and the advancement and improvement of agriculture and local industries generally.

13. PUBLIC HEALTH AND SANITATION

Malaria is the most prevalent disease in Sind. The proportion of deaths ascribed to this cause in Sind is greater than in the presidency. While the death rate from malaria for the presidency as a whole in 1926 was only 2·83, in Sukkur it was 15·13 and in Thar and Parkar 14·50. In that year, all districts in Sind suffered heavily from malaria owing to the high floods and heavy rainfall. Quinine can be obtained through post offices and is also distributed free to school children. The efficacy of quinine in the prevention and cure of malaria is now well recognised in the province and the free distribution of the drug is popular.

Other prevailing diseases are small-pox and cholera. The latter as well as plague, which used to take a large toll at one time, have now been brought under control and Sind has practically escaped from them during the last few years. Small-pox, however, often occurs. The attacks during each of the last two years from this disease were between 5,000 and 6,000 each year and the deaths varied from 1,100 to 1,200.

The birth rate in Sind in the years 1925 and 1926 was 20·58 and 24·32 per thousand respectively, the figures for rural areas being 21·69 and 17·80 respectively. Faulty registration as well as the nomadic habits of part of the population make the figures unreliable. The death rate in the same two years was 19·29 and 16·96 respectively as compared with a rate of 15·20 for the quinquennial period. The urban rate (29·97) greatly exceeds the rural death rate (17·37), but this again is probably

due to faulty registration. Infantile death rate is very high, 185 for 1,000 registered births.

Every district except the Upper Sind Frontier has a Civil Surgeon. For sanitation and vaccination there is an Assistant Director of Public Health for the province who has his own staff of inspectors and vaccinators. There are several hospitals in the district towns and numerous charitable dispensaries in the smaller towns. Vaccination has made satisfactory progress.

ROYAL COMMISSION ON AGRICULTURE.

MINUTES OF EVIDENCE

TAKEN BEFORE THE

ROYAL COMMISSION ON AGRICULTURE.

Friday, March 25th, 1927.

BOMBAY.

PRESENT :

THE MARQUESS OF LINLITHGOW, D.L. (*Chairman*).

Sir HENRY STAVELEY LAWRENCE K.C.S.I., I.C.S.

Sir JAMES MACKENNA, Kt., C.I.E., I.C.S.

Mr. H. CALVERT, C.I.E., I.C.S.

Raja SRI KRISHNA CHANDRA GAJAPATI NARAYANA DEO OF PARLAKIMEDI.

Professor N. GANGULEE.

Dr. L. K. HYDER.

Mr. B. S. KAMAT.

The Hon'ble. Sir CHUNILAL V. MEHTA, Dewan Bahadur A. U. MALJI } *Co-opted Members.*

Mr. J. A. MADAN, I.C.S., Mr. F. W. H. SMITH } *Joint Secretaries.*

Dr. HAROLD H. MANN, D.Sc., Director of Agriculture, Bombay Presidency.

Oral Evidence.

58,626. *The Chairman*: We have a great deal of information about the Department of Agriculture in Bombay and the agricultural education and research in the Presidency, particularly at Poona. Since we examined you last, we have had an opportunity of seeing something of the country that is to be irrigated by the Sukkur Barrage and incidentally of seeing the site of the barrage itself. You were a member of the Committee which sat to consider the special problems arising out of the new irrigation scheme. It will be useful to have from you some idea of the rate at which the recommendations of that Committee, in the matter of research, demonstration and agricultural education, are to be given effect to. First, may I ask you whether the suggestions that that Committee put forward are, broadly speaking, the policy of the department at the moment to cope with the new conditions in Sind?—The proposals put forward by that Committee are the policy of Government in connection with developments in Sind, but they have been very, very much curtailed from what the Committee proposed. The lines of policy have been accepted by Government.

58,626A. I, at any rate, and I daresay some of my colleagues, have been impressed by the difficulties which have faced Agricultural Departments

NOTE.—This evidence has been reprinted from Volume II, Part II, and re-numbered.

owing to fixed customs, established practices and even vested interests, and I think we have felt that in Sind you have a wonderful opportunity of being ahead of time instead of astern of time; are you satisfied with the proposals as they stand and with the rate at which the various elements in these proposals are to be given effect to?—No, I am not satisfied with the rate of progress at which it is intended to carry them out and which has been already sanctioned. The proposals made in 1924 were, I think, fully justified by the importance of the issue in the next few years; but they did cost a very great deal of money which the Presidency was not prepared to face at the time when the decision had to be made in 1925. I was at that time asked by the Minister what were the more important things and what were the more important lines of development, which should be taken up first. I then laid down those lines of development, and they were accepted *in toto* both by Government and by the Legislative Council. But I presented them as a makeshift and as representing merely the more important parts of what I considered were necessary. In passing those it was stated definitely in the Legislative Council that they must be looked upon as the maximum scheme for which money was then available, and that nothing further in this direction would be considered until and unless the matter had been previously discussed by a predominantly non-official committee from Sind. It has taken all my time since then to get the scheme, as actually sanctioned, on foot. In fact, it is not actually on foot at present, and I am not pressing for any further development at present because I do not think I am ready for it. But when we are ready for it (we shall soon be ready for it), I certainly feel that it ought to be undertaken, at any rate ahead of the time when the water will become available in the Province.

58,627. Will that be in 1931?—Yes; in 1931 water will be available.

58,628. After which, development will take place very quickly?—The engineers estimate that it will take forty years before the project will be absolutely complete, but the big developments will take place in the fourth, fifth, sixth and seventh years after 1931.

58,629. Now, in the meantime, you have a station in Sind called Sakrand; is the proposal to start various sub-stations or to extend that?—That station at Sakrand was established as representing as nearly as we could, the largest section of the Barrage, namely the Left Bank Rohri Canal area, about which we felt that we knew least. That was looked upon as a central experimental station essentially for scientific work. When results have been obtained, sub-stations would be established both in the north and south, in order to attempt to work out those results in other stations.

58,630. *Professor Gangulee*: So that you have two stations in view; you have one already?—So far as a central experimental station is concerned, we have only this one; but the idea is to have two sub-stations, one in the north and one in the south.

58,631. What about Larkana?—I am now speaking about the Left Bank area. The Committee proposed a similar central station, one for the Right Bank canals in Larkana; it also proposed a third for the Nara Valley, representing Eastern Sind, without specifying any place.

58,632. Conditions vary from one bank to the other?—The conditions vary very much, both under the proposed method of cultivation and under the existing method of cultivation. Sakrand represents the area which is at present very markedly a cotton area. Now, on the Right Bank, there is practically no cotton, and that has to be developed as a rice and *bosi* wheat area. So that the problems facing the Right Bank are

entirely a different series of problems from those that face the Sakrand area where we are working at present; not only are they different because the crops grown are different, but at present cultivation on the Left Bank area is essentially based on one cropping in three years, and cultivation on the Right Bank area is based on annual cropping, which means the whole organisation of agriculture is entirely different.

58,633. *Mr. Calvert*: What are the crops?—On the Right Bank it is now rice and *bosi* wheat; on the Left Bank it is one crop in three years, either cotton or grain.

58,634. *The Chairman*: What is *bosi* wheat?—A bosi crop is a crop grown with flood water, and not with irrigation water, applied direct to the crop.

58,635. What about the officers required to man these rather substantial extensions when they come along in Sind? Will you be able to find them?—That is a matter of very great difficulty; but so far as the Sakrand centre is concerned we were allowed to have three first-class research officers there, and I think we have got good men. I am one of them; I have spent pretty well half my time there (about five to six months a year) under the present organisation.

58,636. *Professor Gangulee*: The proposal is to have an independent man?—Yes, a whole-time man at Sakrand; that is what Government have agreed to. That is perhaps not quite the way to put it. The Legislative Council insisted that I should take personal responsibility for the actual work at Sakrand; they granted the money only on that understanding. On that, so long as I am here Government have allowed me to take personal responsibility for the work there. When I go, of course, then naturally there will be a separate Director for the Sakrand station for this experimental work, with two first-class research officers.

58,637. *The Chairman*: Independent of the Director at Poona?—It was not originally intended that he should be independent, but it may come to that. I may perhaps tell you what is the present proposal. May I do so? (Sir *Chunilal Mehta*: Yes.) The present proposal is that I am going to retire from the Presidency next October, but Government have asked me to take charge of Sind, as a special charge independent of Poona, for the next three years, to have my residence at Sakrand and be in charge of the whole work at Sakrand and in Sind. That is the proposal; I have not yet agreed to it.

58,638. *Professor Gangulee*: Who are the scientific workers working at Sakrand?—I have got two men, a Soil Physicist and Agricultural Chemist, and an Agricultural Botanist.

58,639. *The Chairman*: How soon do you expect these developments in the organisation to be completed?—I reckon that within the next 12 months the present scheme will be completely ready; then, I shall be prepared to put forward the next stage in order to complete the organisation which the Committee originally proposed. What Government will do I do not know. I shall put forward within the next 12 months proposals for the carrying on of the next stage.

58,640. Have you been able to procure officers who are Sindhis?—Of the two men, in addition to myself, in first-class positions at Sakrand, one is a Sindhi and the other I have taken from the Presidency.

58,641. As regards your future demonstration staff, will you make an attempt to man that with local men?—Yes; entirely with Sindhis so far as it is possible; as far as demonstration work is concerned, with Sindhi Mussalmans, because the agricultural classes in Sind are almost entirely Mussalman.

58,642. Will they be trained at Poona?—Their training will be at Poona; then I shall take them to Sakrand or some other station in Sind for a year or two for special training; and then they will work in the areas.

58,643. And ultimately you hope, I suppose, to provide facilities for training in Sind itself?—I hope that will be done. The Committee of which I have spoken recommended to Government to have a special agricultural college in Sind. That was turned down as being a matter which they could not face at the present time, but it is being at the present time taken up by others, and there is now a local movement independent of Government to establish an agricultural college in Sind. How far that will come to anything within the next couple of years I do not know, but at any rate there is a very strong local movement in that direction.

58,644. Do you think that there is an active, local demand in Sind in favour of research, demonstration and education?—Yes, I think there is quite an increasing demand. Within the last three years the increase in local support and local enthusiasm towards demonstration and towards improvement has been very remarkable indeed. In the year 1922, as Sir Chunilal Mehta knows, there was a very great deal of local apathy; now, I am astonished to find how extreme is the desire to have further help, and help in directions which, three years ago, people would not have.

58,645. *Professor Gangulee*: Is it due to the presence of the Sukkur Barrage?—No; the cause of it, we imagine, is the alteration in the method of demonstration in Sind; the alteration, which was done at Sir Chunilal's direction, has been marvellously successful.

58,646. *The Chairman*: At the present time the prospect of new irrigation has awakened public opinion all over Sind, has it not?—Yes, indeed; everywhere there is a state of expectation now, extending even among the small cultivators.

58,647. Do you anticipate that the new irrigation and the consequent increase in the population will produce an extension in the amount of land under petty ryotwari cultivators?—I hope it will.

58,648. Have you been consulted from the agricultural point of view on that?—No; not on the question of distribution of land. But my feeling, judging from the existing state of things, is in favour of the encouragement of the small holder if possible.

58,649. Do you think that particular aspect of the problem has an agricultural side to it, as to which you may be expected to be consulted?—I do think so.

58,650. *Professor Gangulee*: Has Government formulated a definite policy with regard to the distribution of land?—They have not published any policy; in fact, I understand that the matter is still under discussion in our Government. I have repeatedly referred to the Revenue Officer in connection with the Barrage, and up to date he has always told me that the matter is still unsettled.

58,651. *Sir Henry Lawrence*: On what point?—On the method of the distribution of land.

58,652. *Professor Gangulee*: You told us a little while ago that you have now two men engaged in scientific research in Sakrand, that you have a Botanist there. What special line of work is he engaged on?—His work is chiefly on three crops, cotton, wheat and *juar*, and in all those three directions there is a very considerable amount of promise.

58,653. With regard to the work of the Soil Physicist, he is concerned, I suppose, with the problems of alkali soil?—I may say that on this matter the Central Cotton Committee have given me a grant of Rs.20,000 a year to be applied at Sakrand as a centre for this particular type of problem;

it is intended primarily to be applied to cotton, but incidentally to be applied to everything which is grown on the land. I have not been able to find a suitable Physiologist to undertake physiological work as yet, but I hope to do so before the coming inundation season; I have got the laboratory ready for it.

58,654. *Mr. Kamat*: Supposing the principle of auctioning land were ultimately adopted, do you not think it would be detrimental to the small holder?—I am getting a little bit outside my own subject, but personally I do think so; I think it would very much encourage the speculator, especially if land is auctioned now.

58,655. So you think the land speculator is likely to come in?—I think there is evidence that he is ready to jump at the first chance.

58,656. Have you considered the system in the Punjab of having squares of 27 acres and the system of leasing them out?—The whole of the land under the Sukkur Barrage is going to be squared almost according to the Punjab system, but I do not think that they have decided exactly how they are going to deal with the squares when they are made; but eventually the Punjab system is going to be adopted.

58,657. *Sir Henry Lawrence*: You mentioned that the proposals which have been already sanctioned will be in working order in 12 months from now?—In full working order. All the expenditure which was sanctioned then I shall be able to utilise during the coming 12 months.

58,658. For the following year, 1928-29, when you will put in your proposals to Government?—If all goes well, I propose to put in my proposals about next October, in time to be included in the next year's budget. That would be the next stage. Even then, I do not propose to put the whole of the original committee's scheme, but only a certain stage of it.

58,659. Can you give us any idea what you have in view as to the possibilities of next year?—The next most important stage is the investigation in connection with the Right Bank conditions, the conditions represented by the rice and wheat area on the west bank of the river.

58,660. The Larkana farm has already been in existence for a good many years?—Yes; certainly, before my time; since 1906.

58,661. Do you propose to extend that?—That was the scheme recommended to the Committee, that this farm could be made the basis and extended.

58,662. Is water available there now?—We can get water from the Ghar canal most of the year. Bores have not been a great success there; they have generally given us salt water. But some of the bores there have been a success, and they give us a supply of water which we can use during the time of the year when the canal is not running.

58,663. Would you propose to make any expenditure on tube wells there?—I certainly should. At Sakrand we have been forced to do that in order to supplement the Sakrand *dhand* supply. We have got a tube well down there between 140 and 150 feet deep, and we have got 80 feet of the strainer actually in water.

58,664. Is that giving you water now?—We are not actually using it but by the end of April we shall have to use it to supplement the supply from the Sakrand *dhand*.

58,665. Is there any station besides Larkana and Sakrand that you would propose to start off next year?—Not next year. I think it will take us another two years to get the West Bank into full working order.

58,666. Is that primarily for want of staff?—Not necessarily. I find it takes a great deal of organisation to establish a first-class experimental station, even if you have got the staff.

58,667. Have you got the staff?—I could get it, and that without going out of India. I think I can get men who can do it, partly from other Provinces and partly from men who have been trained in England and who are now available.

58,668. In the open market?—Yes, in the open market.

58,669. All that you require is to get Government sanction to the demands to be made, and you can find the men?—Yes. It might take me a good deal of time. I had a disappointment in connection with the grant from the Central Cotton Committee. I had a Physiologist in view, and at the last moment he dropped out. But I think I can get a man even for this; it will take a few months.

58,670. You think they would be able to start work straight away? You would not require them to go through any course of training before they begin work?—I do not think so. Most of the men are either Cambridge men or men of equal standing. I think they can go straight ahead. For the first years they will want direction, but they have got the technical knowledge. All that they want is a little more experience than they have. As long as I am there, I try to supply it, well or otherwise I do not know.

58,671. At any rate, you are convinced of the necessity of getting through this work with the least possible delay?—I feel so, very strongly indeed.

58,672. You do not anticipate any difficulty from the financial point of view?—That is where I do think there will be difficulty. We shall have to put up a very good case to the Finance Department before they will be prepared to give us more money.

58,673. *Professor Gangulee*: What is your present budget?—For this special development work, it is Rs.1,35,000.

58,674. *Dewan Bahadur Malji*: How much is allotted?—This is the amount actually passed by the Council.

58,675. *Sir Henry Lawrence*: For the Sakrand station?—It is for agricultural development under the Sukkur Barrage. That is to say, it is money in addition to the ordinary Agricultural Department expenditure in Sind. It is granted on account of the development under the Sukkur Barrage, partly for research, partly for propaganda, in order to prepare the people for the system under the Barrage, and so on.

58,676. With that Rs. 1,35,000 you have Sakrand working satisfactorily? You want another equal amount for Larkana?—It will not cost more than another lakh. Of course, there is another point, and that is the question of agricultural education in Sind. What I shall have to ask for will depend on what local support there is. At present there is a move to establish an agricultural college in Sind under private auspices, and if we can get that, there will not remain the necessity to ask Government for so much money.

58,677. According to this report of 18 months ago, the capital expenditure required is about Rs.9½ lakhs and the running expenses about Rs.4 lakhs?—When I said one lakh for Larkana, I was really considering the question of running expenses; I was not thinking of the capital expenses.

58,678. But do you expect to be able to get the capital expenditure from Government in addition to the later other current expenditure?—Yes.

58,679. And that capital expenditure would be in the region of Rs.2 lakhs?—Something like that.

58,680. You mentioned that on the West Bank you did not expect to grow any cotton?—Yes.

58,681. Would you explain why cotton should be barred on the Right Bank, when it is the crop on the Left Bank? Are there climatic reasons? —In part, yes. But I have really taken the scheme of the Sukkur Barrage as developed by the Baker-Lane Committee as being my basis. They have barred this on the West Bank. They have taken the whole of their scheme on the West Bank as based on rice and wheat. I have taken that as the basis.

58,682. Do you agree with it?—It is very difficult to say. It has usually been considered that cotton will not grow successfully on the West Bank.

58,683. Have you tried it?—We have tried it at Shikarpur and Jacobabad successfully. We tried it in Jacobabad last year, and with very considerable success, and I do not see any reason why it should not grow. It is usually considered that the conditions are too hot for cotton, but I do not see any reason why it should be so. Even my own Deputy Director, only last year, did not think it was much use trying cotton up in those regions.

58,684. Cotton has been substituted for rice in certain other districts of the Presidency in the last 20 years?—Very much so.

58,685. There is nothing actually in the soil of rice land that prevents cotton being grown?—Nothing at all.

58,686. You will carry on some experiments to see whether cotton would not also be possible on the Right Bank? That would mean very much less expenditure of water?—Surely it would. The water for rice gives a duty of 50, for cotton it gives a duty of 100. That means to say one cusec (one cubic foot of water per second) will irrigate 100 acres.

58,687. If you could carry it through successfully, it would be a very considerable agricultural improvement?—It would mean that there would be a lot more water for general use.

58,688. Some reference was made to the proposals for small holdings. You know that Mr. Baker, as Revenue Officer, had some scheme for putting small holders on certain areas in the Barrage?—I know, but I never knew the details of the scheme.

58,689. Do you know whether those proposals are being accepted by Government or at what stage they are now?—I do not know. I would rather you asked the Government.

58,690. At any rate, you know that that point has not been neglected?— I do know that, because Mr. Baker himself told me.

58,691. *Dr. Hyder*: You said you were going to engage, as demonstrators and propagandists, men from the Lower Subordinate Service, men who were Sindhis. The only possible source of supply would be the Agricultural College at Poona?—Yes, for the better class of man.

58,692. How many students coming from Sind have you on the roll of the college?—We generally have on the roll of the Agricultural College at Poona somewhere between 12 and 20 such men.

58,693. You think next year you would be able to get 12 to 20 men?— That does not mean 12 to 20 every year. It is a three years' course; we may turn out 6 every year.

58,694. I do not know whether it is a purely agricultural question, but you suggested something about the distribution of land, and you were giving

answers to Sir Henry Lawrence about the institution of small holdings. What is the intention of the Government or the people of the Bombay Presidency? Do they want to relieve the congestion in over-populated areas and transfer the surplus population to the districts in Sind, or do they want to do this operation in Sind itself?—I think there are a great many different points of view. One point of view, which I hear constantly in Sind, is that Sind should primarily be for the Sindhis, that is to say, the Sindhis should have the first claim on all available land. There are others who say that it should be purely on a financial basis, that is to say, people who will pay the biggest money, wherever they come from, should get the land. What has been accepted by Government or what is being accepted, I do not know.

58,695. The Government of Bombay could only go by the experience of the Government of the Punjab? That is the only other Government that has had the same problem?—I know that they might go by that experience. The Revenue Officer, Mr. Dow, has been up to the Punjab in order to make special enquiries into the matter.

58,696. I was wondering whether the experiences of settlers taken from one part of the Punjab to another were known to the people of Bombay?—I think to those who are interested in the subject it is well known, especially since the book "The Punjab Peasant in Prosperity and Debt," has been published, which gives a sketch of what happened in the canal colonies in the Punjab.

58,697. *Professor Gangulee*: As you know, irrigation is not an unmixed blessing; do you think there is any great danger of alkali formation resulting from the Sukkur Barrage? What is the condition of the substrata?—I think there is a distinct danger but I think it is a danger that can be met. Mr. Howard, in his Presidential address at the Science Congress in Bombay last year, put one or two points before the public; he insisted that under the Sind conditions, which are either deltaic or semi-deltaic, you would be very liable to have extensive areas of salt development, and also there would be a tendency for the soil to get dead or unaerated. I certainly consider there is some danger of this, and one of the primary objects of the Sakrand undertaking is to try and meet these dangers in advance. We picked out one of the few places in Sind where I can get river water under conditions which correspond with what will be available after the barrage is constructed. I am taking the Baker-Lane scheme, which is the scheme on which the whole Barrage developments are based, as the basis of all my investigations. We are applying water in exactly the quantity and by the method which the Baker-Lane scheme lays down, and many variations from that; we are taking exactly what happens under the original scheme and under variations which will occur.

58,698. From the analyses of soils which you must have made, what have you found? Sodium chloride or sodium carbonate?—There is very little sodium carbonate, but the soils in Sind as a whole are very full of sodium chloride and sodium sulphate. I have placed in the hands of the Commission a bulletin prepared by my assistant, Mr. Tamhane, which gives the results of the investigations into the soil. You will find from that that the quantity of salt actually present in the arid lands in Sind is greater than in almost any part of the world that is actually under cultivation.

58,699. In view of the importance of investigation in matters of formation of alkali soil, do you think that the amount of money you have at your disposal is adequate?—I do not; I think we could profitably utilise a very considerably larger amount than we have got at present; there are many lines of investigation which *may not* be important, but which on the other hand, *may* be *very* important, which one has to leave on one side owing to lack of funds.

58,700. You have made a reference to agricultural education; how many students have you now in Poona from Sind?—As a rule we have somewhere between 12 and 20 altogether from Sind.

58,701. You find there is a growing demand for agricultural education in Sind?—If we had a college in Sind I am sure we should have three times that number immediately. After all, it is a long way to go from Sind to Poona, and Poona conditions are not similar to those of Sind. For some years we utilised the Punjab College at Lyallpur, but that was given up after the Reforms, and now we utilise the Poona College.

58,702. *Sir Henry Lawrence*: Why was that given up?—Because the Government of the Punjab insisted that we should pay the whole of the cost which they incurred per student on account of our own students; that the Bombay Government should pay the whole cost of educating those students.

58,703. Why should they not?—We had been accustomed to give a scholarship of so much a month which maintained the student. We gave full welcome as we still do, to students from other parts of India, up to the limit for which we can give space, at the same rate as we do for our own students; but the Punjab Government said: No, we will not admit these students at the same rate as we do our own students, you must pay the whole cost. The Government of Bombay said: No.

58,704. *Dr. Hyder*: When did this happen?—About 1922 or 1923.

58,705. *Sir Chunilal Mehta*: I think they also said there was not room in the College; I think that was one of the reasons. I am only speaking from memory?—I do not remember that being a factor; the other, I am certain, was the main factor.

58,706. *Professor Gangulee*: Where would you locate a college in Sind?—I should locate it in the Indus Valley, if it can possibly be done; any other arrangement I should think would be very much of a makeshift. The Commissioner's Committee recommended Nawabshah, which is about one-third of the distance between Hyderabad and Sukkur; I would like to have it somewhere in the Barrage area.

58,707. *Sir James MacKenna*: It is fairly hot?—Yes, it is hot, but then Sind generally is hot.

58,708. *Mr. Kamat*: In your future scheme on the Sukkur Barrage would you shut out capitalist farming, that is to say, farming by men with capital who would adopt machinery such as tractors, and would have sufficient intelligence and enterprise to adopt improvements?—I would not shut them out, but I would not make them the principal plank in my platform.

(The witness withdrew.)

(64893r) Wt. P. 2238—700/1433 2500 1/28 H. St. G. 71.

Monday, October 24th, 1927.

KARACHI.

PRESENT:

The MARQUESS OF LINLITHGOW, D.L. (*Chairman*).

Sir THOMAS MIDDLETON, K.B.E., C.B.

Sir JAMES MACKENNA, KT., C.I.E., I.C.S.

Mr. H. CALVERT, C.I.E., I.C.S.

Raja Sri KRISHNA CHANDRA GAJAPATI NARAYANA DEO of Parlakimedi.

Professor N. GANGULEE.

Dr. L. K. HYDER.

Mr. B. S. KAMAT.

The Hon'ble Sir CHUNILAL V. MEHTA, KT.
Mr. JAMSHED N. R. MEHTA. } (*Co-opted Members*).

Mr. J. A. MADAN, I.C.S.
Mr. F. W. H. SMITH. } (*Joint Secretaries*).

Mr. C. S. C. HARRISON, Chief Engineer, Lloyd Barrage and Canals Construction, Karachi.

Replies to the Questionnaire.

Introductory.

I have had the opportunity of perusing the general introductory note which prefaces the replies of Mr. C. C. Inglis, Executive Engineer, Special Irrigation Division, Poona, (pages 226 to 228 of Volume II, Part I, of the Evidence taken in the Bombay Presidency) and would take this opportunity of expressing my general agreement thereto.

I would emphasise the point that action by irrigation and agricultural officers should have as its goal 'the greatest good to the greatest number'.

My experience of twenty-five years leads me to the conclusion that this great desideratum has been lost sight of. Purely local considerations have been given too much prominence in the past and have thereby hampered the general progress of irrigation agriculture towards a higher standard of efficiency.

QUESTION 1.—RESEARCH.—(*a*) Research and demonstration should be entirely separated. Research in irrigation agriculture must be undertaken hand in hand by the Agricultural and Irrigation departments, special research officers in both departments being available.

Likewise, demonstration work in connection with irrigation agriculture should be carried out hand in hand by both departments.

I have a great respect for many forms of indigenous agriculture and so has, I believe, the Agricultural Department. There should be very careful research into the better forms of indigenous methods and this should be the starting point from which gradual improvements should be made. I consider it most difficult to get the average cultivator to adopt sweeping reforms. Where such are tried there is a great waste of energy. They may win through

in the end but probably not one whit quicker than if the gradual building up process had been adopted from the first.

Provincial research and demonstration should be assisted by a central research station for all India. Central research results may not be applicable to all Provinces but the co-ordination of knowledge must surely lead to improved agriculture in parts of almost every Province in India.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(*a*) to (*c*) I give a full meed of praise to the Agricultural Department for the keenness displayed in research work for the betterment of species of crops and of methods of agriculture in general. I have not, however, always been able to see eye to eye with the methods adopted to increase agricultural efficiency.

I consider that practical demonstration farms fail partially in their object because the arrangements on such farms are generally too elaborate. The ordinary cultivator on being shown over such demonstration farms at once says: "this is all very nice but it is hopeless for me to try and work on these lines as I have not the necessary capital". He gets a wrong notion of the capital required because his attention is first and foremost attracted by the elaborate and costly main buildings erected on the farm. He cannot get this out of his mind and go further and see that the actual field operations are simple and inexpensive. The lesson to be taught him is therefore hopelessly lost.

I advocate the complete separation of experimental from demonstration farms.

On experimental farms, the initial arrangements are necessarily costly but such cost is never required to be borne by the cultivator; he merely has to consider the results of such experiments which are put into practice on the demonstration farms and reap the benefits therefrom if he can seize the opportunity.

I consider it is of little use showing the average cultivator over an experimental farm. He is not the type of man that wants to know the detailed "whys" and "wherefores" of a thing; what he wants are solid facts. He wants to see for himself that, for instance, a particular variety of wheat advocated by the Agricultural Department can be grown under conditions that he can, with little additional expense, adopt himself. He wants to know its yield in straw and grain and he wants to know what price he is likely to get for the produce.

This information he ought to be able to get from a simple type of demonstration farm. But I would not leave the process of education there. I would go much further and to what I consider the root and branch of successful propaganda; I would go into the man's field and demonstrate there that he has all to gain and nothing to lose by adopting the seed and methods of cultivation advocated.

My concrete proposition is that the Agricultural Department should be given sufficient authority to guarantee selected cultivators against any loss that might be incurred by carrying out demonstrations in such cultivators' fields.

The seed should be that which the Agricultural Department has selected and is prepared to back as a winner. The ground and labour should be supplied by the selected cultivator (be he peasant or big zamindar) and in fact, all the operations should be performed by the cultivator and/or his men, the guidance being supplied by the Agricultural Department.

The guarantee should be given that the cultivator will be protected against loss, if he carries out the various operations exactly according to the instructions given on the spot. He should be told that, given normal seasonal conditions, he should expect a minimum of so much fodder and so much grain per acre. If the actual output of the crop is below that minimum then the difference should be made good in cash by Government.

The minimum of any crop to be pushed would, of course, be better than the average yield that the cultivator with his own unimproved seed and methods has obtained in the past.

If the seed and the methods of dealing with its cultivation advocated by the Agricultural Department are really worth pushing, then the actual payment by Government will be *nil* in ninety-five per cent of the cases so dealt with.

The success of the demonstration will have the fullest possible value and the cultivator will be the best propagandist that Government could possibly have.

Just as experimental farms should be entirely separate from demonstration farms, so should the research officer be entirely separate from the trained demonstrator.

Irrigation and agriculture should go hand in hand both on the experimental as well as on the demonstration farm. I would lay great stress on the type of agricultural officer to be employed as a demonstrator and propagandist. To me it appears that personality is of paramount importance.

What is required of the demonstrator is a man strong physically as well as mentally, a man who is a linguist and, most difficult of all qualities to estimate, a man who will take a very real personal interest in the cultivator. I feel that the ideal is hard to attain but that something better can be done in the future than has been done in the past in the selection of the right type of officer. It appears to me that, in general, too much importance has been attached to the academic rather than the practical qualities of candidates for the service.

I would emphasise that to depend too much on the distribution of pamphlets setting out this and that improvement is to court failure. I have met many cultivators who have read these or had them explained to them who have said: "It may be all right but I want to see it done".

One particular fruit grower, whose garden I visited in Sind, told me he had read of certain improvements in the tending of citrus plants but he had never been able to get any one to come to his area and demonstrate such.

A statement like that (and it is not an isolated instance) led me there and then to believe that the Agricultural Department has so far failed to get sufficiently into personal touch with cultivators. I do not blame the present officers, because there are not enough of them to make their presence felt. This points to the need for considerable expansion of personnel on the demonstration staff.

QUESTION 4.—ADMINISTRATION.—(*a*) As mentioned in my reply to Question 3, I consider that there should be a central research station. This should be operated by a staff which has on it at least one experienced irrigation officer who would deal with the water problems connected with irrigation agriculture. There should also be one or more research stations in each Province. In the Bombay Presidency two stations are required—one for Sind and the other for the Deccan and other parts of the Presidency. Sind conditions are so different to those in the Presidency proper as to make it futile to expect the Deccan research appreciably to benefit Sind.

(*b*) Certain branches of the central research institute could deal with subjects common to all Provinces. For example, the study of hydraulic problems immediately connected with agriculture could be done by one man at the central station, for all India; likewise, the problem of general marketing of agricultural products common to most, if not all, Presidencies.

(*c*) (*i*) I have dealt with the defects of the Agricultural Service as they appear to me. Their remedy lies chiefly in the provision of extra funds and more, and a better type of, establishment.

I consider that, to a lesser degree, more superior establishment is required in the Veterinary Service.

(*ii*) I consider that the railway service in Sind is susceptible of great improvement in that feeder lines are required and every step possible should be taken to minimise the nuisance of break of gauge. Proposals are afoot for improving railway facilities as regards feeder lines. I trust that the broadest view possible will be taken by the Local Government of this very important subject.

(iii) Roads. I attach the greatest importance to good feeder roads. These are conspicuous by their absolute absence in Sind. I attach far more importance to real feeder roads to railways than to through or trunk road communications. The latter are a military necessity but from the agricultural point of view good feeder roads are essential. What strikes one in Sind as a very heavy handicap to agriculture is the bad state of the so-called roads and, as a direct consequence thereof, the hopelessly inefficient and antiquated type of cart. Most of these carts have little more carrying capacity than the common European hand-cart and yet we find them drawn by a good pair of bullocks toiling along bad, dusty or sandy roads. This, to my mind, is a very serious cause of the unnecessarily substantial cost of marketing agricultural produce in Sind.

The question of better roads is at present engaging the serious attention of Government. I trust that practical results will emerge at a very early date from such considerations and that effective action will not be indefinitely delayed on the plea of lack of funds. The problem is so pressing as to require urgent attention to the financing of a scheme for immediate road improvements.

QUESTION 7.—FRAGMENTATION OF HOLDINGS.—(*a*) The greatest step that can be taken to check excessive fragmentation of holdings in irrigated tracts is to fix a minimum area that will be dealt with for the purposes of irrigation.

Fragmentation of holdings in the Bombay Deccan is a far more serious problem than it is in Sind and I would fix, for the Deccan, five acres as the minimum area for the purposes of irrigation. In Sind the minimum area for all holdings after a fixed date might well be a square of sixteen acres.

QUESTION 8.—IRRIGATION.—(*a*) In Sind there is still scope for very great improvements in the irrigation of the area outside the Barrage Canals zone. The initial capital cost and scope of the Barrage Scheme is so great as to make it possible that Government might lose sight of the necessity of further developments in this sub-province. This danger should not be overlooked.

The north-east tract of Sind known as the Ghotki area will require development within the next decade or so and in Lower Sind there is scope for the immediate improvement of irrigation. These improvements would all, for many years to come, have to be of the non-perennial type.

In the Deccan there is a large number of schemes prepared which can be taken up one by one as soon as the vital problem of how to make the Deccan irrigation pay is solved.

I would advocate the taking up of the Mula scheme to irrigate parts of the Rahuri, Nevasa and Shevgaon talukas.

Lift irrigation is a subject that requires very careful investigation and encouragement. In Sind the problem is to lift water from canals, the Indus, or *dheros* (depressions) rather than from wells. Contrary to the Deccan conditions, the head to which water has to be lifted to enable it to flow on to the land is generally quite small. For instance, lift irrigation schemes in Sind that will each command many thousands of acres of land could easily be investigated.

The solution of the problem of low lift pumps of high discharging capacity requires encouragement. This problem must also be present in other Provinces, especially in the Punjab and the United Provinces.

I know of at least one person who is devoting much time to the evolution of an efficient low lift high capacity pump of economical design. It would seem advisable to let the conditions be known to firms in Europe and America who are prepared to take the matter up seriously.

(*b*) I am not satisfied with the existing methods of distributing canal water in Sind. The problem is such a great one that any attempt at present to claim a final solution must be looked upon with suspicion. The first step towards solution of better distribution is to module all outlets. By this method proportionate distribution is possible, and pending the evolution of a practical method of distribution of water by volumetric measurement the proportionate module will go a long way to give an equitable supply to all that are entitled to it on a canal.

As regards evaporation losses in canals, little or nothing can be done to reduce these. As regards absorption losses, our new canals are so designed as to seal themselves as far as possible with silted berms. The silt in Sind being finer than it is in the Punjab, we hope to have less difficulty in water-logging from canals though I hold, as do others, that the main source of water-logging is from the irrigated fields and not the canal itself. Little has been done in Sind, in the past, to prevent waste of water by evaporation and absorption in the soil, so far as water on the fields is concerned. The proper sub-division of fields into smaller plots by means of low *bunds* is essential and the value of proper tilling and inter-cultivation requires to be brought more prominently to the notice of irrigators. If attention is paid to these important points the water logging problem will be greatly simplified.

QUESTION 9.—SOILS.—(*a*) (*i*) I consider it essential that great care should be taken to see that effective drainage is provided in all areas subject to perennial irrigation. Sind differs from the Deccan in that defective drainage can be dealt with on a simpler and much larger scale in the former than in the latter tract.

The more or less localised drainage in the Deccan canal tracts is a part of the investigations and work being undertaken by the Executive Engineer, Special Irrigation Division, Bombay.

In Sind, there is no officer on special duty for this purpose. Drainage precautions for the area commanded by the Lloyd Barrage Canals are not being overlooked. There is provision in the project, amounting to nearly two crores of rupees, for this work. The first step to be taken is the provision of main drains, followed by branch drains. The greatest care is necessary to see that the general drainage lines of the country are not blocked and this is receiving particular attention in all the alignments of canals. This very important point was not attended to in the past. Local drainage must be taken up later, after carefully watching the effect of perennial irrigation in what might be, *prima facie*, doubtful areas.

Much can, I think, be accomplished by rather deep open drains. These have not been advocated in the past owing to the great expense of keeping them clear of the choking forms of aquatic growth—in Sind the bull-rush or *pun*. The advent of the small and very handy Diesel drag-line excavators mounted on caterpillars removes the old standing objections to open drains in that these machines will be able to clear muddy drains choked with reeds very quickly and economically.

Soils in Sind under perennial cultivation will require careful tillage and the improvement of the tilth can be effected by the extensive use of green mulches.

The sub-division of irrigation holdings into reasonably sized plots by means of earthen *bunds* or ridges is necessary to provide an even and economical use of the water.

The aim in the Barrage Canals zone is to divide the land into sixteen-acre squares or rectangles and to sub-divide these rectangles further into four-acre plots. The final and ideal condition will be the further sub-division into acre plots. This rectangulation of existing holdings in Sind will be no easy matter but it is hoped that the more enlightened of the big zamindars will lead the way: we will have to depend on sound propaganda to bring in the smaller holders.

(*ii*) In Sind the two most likely methods of reclaiming alkali lands are leaching and the growth of hardy crops such as red rice. The gradual growth of *babul* trees which are cut when less than a year old is also practised successfully in parts of Sind.

Leaching out of the salts will be more successful in the future than in the past, in the Barrage Canals zone, as there will be adequate subsidiary branch and main drains to carry away the water after washing.

The reclamation of alkali-infected lands has been very successfully carried out in many parts of the rice areas in the Larkana district.

(*iii*) Erosion of the soil by flood water is not a very serious problem in Sind for, except in the western parts of the Larkana district and the area to the extreme north-west of the Barrage Canals area on the right bank of the Indus, flood water is not a serious problem owing to the absence of heavy rainfall in Sind. The particular areas mentioned above are to be protected by flood-diversion *bunds*.

QUESTION 10.—FERTILISERS.—(*a*) Natural manures have, on the whole, been little used in Sind in the past except where garden crops, tobacco and hemp are cultivated and these, as a rule, are near villages only.

With the advent of perennial irrigation the more frequent use of manures will be necessary as fallows will be less frequent.

There will always be an inadequate supply of farm-yard manures even if greater attention is paid to the conservation of this valuable by-product. I therefore expect to see the extension of green mulching assisted by artificial fertilisers.

The spread of knowledge in this direction by the Agricultural Department might well be considered at an early date.

QUESTION 23.—GENERAL EDUCATION.—(*b*) (*i*) I make bold to say that rural education should not aim as high as it does at present. I hold that for many decades to come the best form of education for the agricultural masses is to teach up to, say, the fourth standard in rural schools.

For a start (and it must be a slow start to be thorough) the teaching of the elementary portions of the " three R's ", supplemented by the teaching of the important points of agriculture, will suffice.

The simple vernacular readers should all be thoroughly revised or scrapped, and readers with agricultural and moral lessons written in the most simple and interesting way provided.

Only a very small percentage of boys of the agricultural population have either the desire or the inclination for the higher forms of education and there is already scope for these to rise.

The rural masses, especially in Sind, do not, in my humble opinion, desire even a middle school education and, moreover, if any attempt is made to coerce them education will become unpopular.

The agricultural boy requires, and that urgently, to know just sufficient to enable him to do simple arithmetic, keep simple accounts and read very simple literature. With this amount of knowledge he will remain on the land and be contented.

Oral Evidence.

58709. *The Chairman:* Mr. Harrison, you are Chief Engineer of the Lloyd Barrage and Canals Construction, Karachi?—Yes.

58710. Will you tell the Commission what your principal appointments have been in the past and, in particular, whether you have had agricultural experience?—I started my service in the Belgaum district on irrigation on the Gokak Canal; after one year I was transferred to the Roads and Buildings branch of the Public Works Department and continued to serve for three years in the district in that branch. Then I was transferred to the construction of the Godavari Canal and Darna Dam in the Nasik and Ahmednagar districts. After that I had charge of the roads and buildings in the district for eighteen months. Then I again on return from leave did duty on the Irrigation side, taking charge, on the completion of their construction, of the Godavari Canals and Pravara Canals, Deccan irrigation schemes. After that I proceeded on leave, and on return I was posted in charge of the Karachi Canals district which is the southernmost district of the Province of Sind. After two months in that charge, I was put on special duty in connection with the Sukkur Barrage Scheme. After two years, when the scheme was sanctioned, I was made Chief Engineer, and I have been Chief Engineer of the scheme since its inauguration in June 1923.

58711. I judge from your note that you have also interested yourself in the problems of agricultural research in general?—Yes, when irrigation was started in the beginning in the Ahmednagar and Nasik districts. Irrigation of any sort except what they call *bandara* irrigation was then practically unknown. It was very up-hill work trying to teach the people what to do, because the Agricultural Department were under-staffed, for most of the eight years and three months that I was there by myself. I started an agricultural society called the Godavari Canals Irrigators' Association and interested myself in all forms of agrieulture, and I used to hold lectures. I introduced the steel plough into that part of the country, and I have been interested in agriculture ever since.

58712. I see from page 11 of your note of evidence that you consider that demonstration on the cultivator's own holding is the most likely to lead to good results?—Yes.

58713. And you think that the cultivator should be compensated against any loss which may result from his adopting the suggestions of the Agricultural Department?—Yes; my idea is to remove suspicion. The cultivator in this country often thinks that methods advocated by Government come from interested sources and that the officers are simply trying to demonstrate that they are doing a job of work, without necessarily benefiting the cultivator; that is why I think the work should be carried right into his field.

58714. That would involve a very considerable staff to check these experiments, would it not?—I do not think so: certainly more than we have got now, because my opinion is that the Agricultural Department is very much under-staffed. Practical demonstration need only be done in certain representative localities.

58715. A guarantee against loss sometimes tends to provoke the loss?—That is a danger, of course.

58716. On page 12 of your note you say you consider that there should be a central research station for irrigation?—Yes.

58717. And you say that this should be operated by a staff having on it at least one experienced irrigation officer?—Yes.

58718. What other staff are you contemplating for this central research station?—I should have my soil physicist and the different plant breeders: experimenters on the different crops, one of the most important being the soil physicist, because there are many problems still to be solved by the soil physicist in India.

58719. Are you contemplating this central research station carrying out work on plant improvement and also work on the fundamental problems of irrigation?—In addition to the local ones, yes.

58720. You would marry research on irrigation to research on plant improvement and other problems of the soil?—Yes, exactly; I think they are inseparable.

58721. You do not think there is work for a specialised central irrigation station?—Yes, I do.

58722. Would you, at that station, also carry on agricultural research?—Yes, I would.

58723. Turning to page 13, Question 8, on irrigation, you point out that over and beyond the area which is to be developed by the Lloyd Barrage, there are other districts such as the north-east tract of Sind known as the Ghotki area. Would that involve important works?—Yes, on the inundation principle; and, later on, when Government could afford it, it would involve very important works in that there would have to be a weir or a small barrage at Mithankot which is just outside the Sind boundary and sufficiently near it to command irrigation within Sind.

58724. But you say that these schemes would all, for many years to come, have to be of the non-perennial type?—Yes, because of the financial question. I do not think the Bombay Government can be committed to further very heavy expenditure until they have got the Barrage scheme going thoroughly, which will take ten or fifteen years.

58725. Would it mean a weir?—Yes, it would mean a weir for perennial irrigation.

58726. But your idea would be to have inundation irrigation?—Inundation to start with, as no weir is required at all for an improved inundation system, and ultimately I would convert the inundation canals into perennial by having a weir. The same would apply to Lower Sind.

58727. You speak, a little lower down the page, about lift irrigation; and you give it as your view that that subject requires very careful investigation and encouragement?—Yes.

58728. Is there scope in Sind, do you think, for lifting water directly from the River Indus on to the banks?—On a very small scale only, because there are very few points on the Indus which are stable enough to admit of installations being put on the bank with safety; the river changes its course so frequently.

58729. And you may lose your station?—Exactly.

58730. Why should not you put your pumping unit on to a float and pursue the Indus wherever the Indus goes?—That could be done but you may have to pursue it two or three miles; it moves so tremendously.

58731. If you have a float, that is not a very formidable undertaking, is it?—It is, in building up the approach channels or what we call the *katchas*. If there is a bank of fifteen feet, when the river moves away it may leave you another bank of fifteen feet or perhaps a bank of only three or four feet just above the river surface; that would mean that if you did not go in for very high lift pipes you would have to have very high banks to carry your irrigation channels. The cost would be crushing; you would not be able to irrigate more than about 2,000 acres probably by that scheme, because we get as near to the *bunds* as we can with the Barrage scheme; it is only the danger points we leave alone.

58732. There are districts which will not be supplied with water by the Barrage scheme?—Yes; but the same consideration would apply, because the protective *bund* system comes in there.

58733. You do not think that the economic possibilities of irrigating the riparian tracts by means of a pumping unit on a float would be worth investigation?—I scarcely think so; I do not think you could ever get results on a large enough scale to make it worth while.

58734. One has seen pumping units doing good work on the Nile and in other parts of the world?—Yes, where you get no erosion. There are very few spots in Sind where you get no erosion on the banks. I am not prepared to say off hand that there are not any but I do not think there are a great number.

58735. As I understand it, quite apart from the risk of losing your pumping unit, the arrangements for carrying the water from the point of delivery by the pumps to the arable land are so considerable and so expensive as in themselves to make the scheme not worth while if there is a risk of losing them?—Yes, generally speaking; there may be a few exceptions, but that is the general case. I would like to emphasise the importance of this lift irrigation in case I am not asked further questions. The Government of India should encourage people to go in for research on what I call low lift high duty pumps. There is a great deal to be done on that question. I am talking about pumps that will raise anything up to 50 to 100 cusecs of water per : not the ordinary commercial pumps we have now which only deal with 2 or 3 cusecs. There is one gentleman belonging to the firm of Messrs. Duncan Stratton who is now investigating the question with the help of Swiss experts and I think he, very likely, will solve the problem by means of an internal combustion engine working separately from the plant. The power problem is not the difficult one: it is the pump which is the difficulty; the power is not difficult at all. In a country like Sind there is great scope; I have got a case on the tail of the Rohri Canal, where we have over 40,000 acres of lift land. The maximum lift there is four feet and I just cannot command that without spending enormous sums and re-grading my canals. That is a place where, if a low lift high duty pumping scheme could be worked up, it could probably be made to pay very handsomely.

58736. On page 14 you say: "As regards evaporation losses in canals, little or nothing can be done to reduce these. As regards absorption losses, our new canals are so designed as to seal themselves as far as possible with silted berms." What is the particular grading of the canal bed which encourages silting?—You have the main channel of your canal in the centre and you set your banks back sufficiently to allow the velocity of the water to drop on the sides of the canal; the silt immediately drops and forms what you call a berm, which is more or less water-tight; and in Sind it is very water-tight. Of course, our canals are so designed as not to drop silt in the main channel.

58737. On page 14, in answer to Question 9 on soils, you deal with a very important point, namely, the drainage which would be necessary if the land to be irrigated by the Lloyd Barrage is to be protected against the risk of progressive deterioration as the result of waterlogging. Are those drains being dug now?—No.

58738. How soon are they going to be dug?—I have purposely delayed them until we have practically completed the canals, and we shall start them the year we start irrigation. That will give us plenty of time.

58739. Have you got your detailed plans for drains worked out?—I have all the main alignments worked out.

58740. What other departments have seen them?—No other departments have seen them yet. Before you can design a modern canal you must fix your drainage lines; those lines have all been fixed and have been shown on the maps which were sent to Government with other plans sent up. When I send the plans up for the Rohri Canal I will show, in great detail, all the natural drainage lines.

58741. Would it not be well to protect yourself as soon as possible against the risk of finding, when you come to make your drains, that vested interests are already established: for example that the local authority is contemplating a road where you wish to dig your drains?—We are acquiring those lands as fast as we go along and no Government land will be given out on the main alignments without the special sanction of the Chief Engineer.

58742. So that it is the case that no development can possibly interfere with your drainage schemes?—Exactly.

58743. Is it definitely a part of your programme to start these drains in the first year that you give the water?—Yes, that is a definite part of my programme which I have put up to Government. Originally, the project contemplated their construction *pari passu* with the construction of the canals; but I pointed out that the danger of that was that we should be so busy with the canal alignments that we possibly might not have sufficient time to study the question of drains adequately. Certainly my opinion is that as soon as we have broken the back of the main problem of the construction of the canals, we shall then be at leisure to concentrate on the drains. The alignments are already settled: nature has done that for us. As soon as the canals are completed we can get our main drains in. But the very important point to remember is that the branch drains are even more important than the main drains, because we have got to study the weaknesses of the country. We have not got sufficient knowledge of Sind to enable us to know where our weak spots are likely to be, at present.

58744. Do you attach great importance to a sufficient drainage scheme?—Extreme importance.

58745. *Professor Gangulee:* Has the possible expenditure on the drainage scheme been included in the total estimate?—Yes, roughly two crores of rupees.

58746. *The Chairman:* Then you go on, in an interesting paragraph, to tell the Commission that the peculiar difficulty of keeping these drains clear of aquatic weeds which might choke them is likely, in your view, to be overcome by the new machines which are available for that work?—Yes, we are using those machines to excavate our canals. The main difficulty in the old days was that you could not get manual labour to stand in two or three feet of water and mud, and in the cold weather work among these reeds and things like that was done under extremely cold conditions. Nowadays, we can bring these machines along on their caterpillars, they can stand on mud and they excavate just as well in the wet as in the dry.

58747. They can stand on mud?—Yes, they can stand on mud.

58748. Can you give us now, or provide us at your own convenience, with any figures of the cost of clearing drains by means of that sort?—Yes, I can give you the cost of excavation of canals which would be the same as the cost of excavation of drains.*

58749. At what depth can these machines work?—I had one instance where we went below sub-soil level and worked as cheaply as in the dry.

58750. They must have solid ground to rest on?—Yes. They want mud or soil to rest on. They are all on caterpillars; the pressure is very little, and you can put a mattress on the mud if it proves very quaggy.

58751. Are you familiar with Bengal?—No.

58752. You tell us that one of the methods of reclaiming alkali lands is the gradual growth of *babul* trees which are cut when less than a year old. Does it mean chopping?—They are cut right down to the ground. In Sind they grow anything up to three feet six inches in a year. They are felled right to the ground and ploughed in. Sometimes they plough it in after a three months' growth, when it is about a foot high.

58753. I do not propose to examine you in any detail upon the other part of your note, which is not concerned with your own special subject, except that I notice, in answer to question 23, you express the view that education should be given in very small doses?—Yes.

58754. Do you think it is possible to arrest a process of that sort?—I do not think it is possible to arrest it, but I certainly do not think we should encourage it beyond the capacity of the people, that is, forcing upon the agricultural masses education of a type which I would call much too high for their capabilities. I have personally had brought to my notice instances of many cultivators who dread education, specially in the Bombay Deccan, who were terrified at the idea of schools as they said it meant that

* Vide Appendix I.

their children would be taken away for four or five years in order to attend school, when they should be working on the fields.

58755. *Professor Gangulee:* You are referring to higher education, and not the primary stage?—I am referring to anything more than the very primary stage, that is, just to stop them from being illiterate; simple reading, writing and arithmetic, simple accounts to enable them to draw up their total costs.

58756. *Sir Thomas Middleton:* In taking into account the development of Sind that will follow the completion of the Barrage project, have you been examining the question of roads and road communications in Sind?—Yes. I happen to be in charge of the Government's enquiry into roads in Sind. We have got a special Roads Division, and I have an Executive Engineer serving directly under me to go into the whole question of roads and communications in general.

58757. Is it the intention to use the canal banks for such purposes?—I think that the canal banks can only be used to a very limited extent, because my idea is to connect up the more important towns direct with the railways. I think that a great mistake has been made in the past in having through communication in irrigated tracts, and that money has been spent which could be ill afforded. The canal itself is a direct communication through the tract, and therefore we could not use much of the canal bank for purposes of inter-communication between the important villages.

58758. When I was in Egypt recently, I was struck by the great use made of canal banks for purposes of communication?—We have provided for it in the project. We have got an inspection road and also what is called a 'service' road right throughout.

58759. I was also impressed with the good quality of the road surface, and with the carts that they employ, on these surfaces. I do not know whether you have been considering the character of the vehicular traffic that you have got in Sind?—I have got some interesting photographs which I would like to hand over to the Commission. One shows the Sind type of cart, which is a most hopeless proposition; you will find a pair of fine bullocks drawing a most antiquated vehicle; that is the Sind cart. One of the photographs is of the Punjab cart; that is a different proposition entirely. Then there is a photograph of the Sind town cart; that does not go out into the fields. I can hand you over, along with these photographs, a note† containing a great deal of information as to the measurements of these carts, the weights they will carry and the power required to pull them. I think you would find by a study of this question that Sind loses over a rupee an acre on every acre cultivated per annum, through inferior carts.

58760. *The Chairman:* Have you invented a better one?—No. I think the Punjab cart will be good enough for some years to come.

58761. *Sir Thomas Middleton:* Your view is that the Sind vehicle is destructive of the surfaces of your canal banks?—Entirely so; it is a hopelessly uneconomic proposition.

58762. *Mr. Kamat:* Whose business would it be to invent a better type of cart?—I do not know. It is the business of anybody interested in the welfare of the country.

58763. Have you advertised, offering prizes for better types of carts?—No, but that is a good idea. We have two very good types of cart, the Gujarat and the Punjab types. They are cheap, made locally in the villages, and, as you will see from the photograph, have enormous carrying capacity. They can carry up to 30 *maunds* on an earth road and 45 *maunds* on a metalled road. The Sind cart can carry only from 7½ to 10 *maunds*.

58764. No department has made it its business to introduce and familiarise this type?—Not in Sind.

58765. *Sir Thomas Middleton:* When you referred to the quality of the Punjab and Gujarat carts, were you taking into account the crushing effect of the wheels?—Exactly so.

† Not printed in full. Extract printed as Appendix II.

58766. Have you studied it?—We have studied it; I will put in this note,* which describes the crushing effect.

58767. I think you have been associated with Dr. Mann in some of the experimental work which has been going on on the Sind Experimental farm?—I have been very closely associated with it.

58768. Dr. Mann unfortunately is not here to give us any information. I do not know whether you could tell us the objects he had in view in designing this experimental work?—The objects in view were to see whether we could introduce any new varieties of crops into Sind and improved types of existing varieties, to study the question of a proper rotation of crops, the effect of fallows, the improvement of salt-infected areas, and the question of the amount of water required for irrigation.

58769. How long has the farm been in existence?—Two years now.

58770. Have you yourself derived any useful hints from it yet?—The report was issued about a month ago by Dr. Mann. Not a great deal can be based on it, because it is only one year's result, but everything points so far to greater yields than we expected and the use of less water than we expected.

58771. Reference has been made to the need for a central station for irrigation research. Do you mean a central irrigation station for all India, or a central station for the Province?—I should have a central station for all India, and I have mentioned in my replies to the Questionnaire that there should be two stations for the Bombay Presidency, one for Sind and one for the rest of the Presidency; I call them provincial stations. Those would deal more with our domestic problems.

58772. The domestic problems you have already indicated in the evidence: to begin with, washing out of white alkali, and the amount of water required, which must vary Province by Province and district by district?—Exactly so; that is the great point.

58773. That is one of the most important points which has got to be determined and must be determined locally?—Yes, exactly. It is no good dogmatising from Poona what can happen in Sind, because it does not necessarily apply.

58774. Have you, in Sind, any black alkali?—Yes.

58775. Is there any known method of dealing with that particular cause of barren land?—In the Larkana district there is a great deal of black alkali, and it is very successfully dealt with by the growth of red rice and *babul* plantation. It is very black alkali.

58776. *Professor Gangulee:* You do not use gypsum?—No.

58777. *Sir Thomas Middleton:* Black alkali has proved the trouble in reclamation in most countries?—Yes. Even in Sind nothing can be grown on it for several years, except rice.

58778. Reference was made to the difficulty of giving a guarantee against loss to the local cultivator who conducts a demonstration. I think every one is agreed that, if possible, there ought to be these local demonstrations, but the giving of a guarantee against loss is objectionable?—Yes, that is the difficulty, but I do not think that it is insuperable, because, if the Agricultural Department have got anything worth pushing, they will fix the minimum outturn, which must necessarily be an enormous increase on the average outturn the man now obtains. If they can give him a minimum guarantee, the difference between the outturn according to the Agricultural Department's methods and the cultivator's own methods of cultivation might be very little, in the case of a small area. As I have pointed out, I do not expect the Agricultural Department to rush blindly into this without being certain of their facts in 95 per cent of the cases, assuming, as the Chairman said, that there is no wilful neglect and damage on the part of the cultivator himself, which I do not think is likely.

58779. Do you think, instead of a guarantee, it would be practicable to buy up the crop?—Yes, quite so. That is a form of guarantee.

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* Note referred to on page 20.

58780. You could make it the subject of a definite contract beforehand?—Exactly.

58781. Whereas a guarantee introduces the question of what is a normal crop after the crop ripens?—Yes.

58782. *Mr. Calvert:* On this question of a central research station, we found in Egypt that they have a staff of about twelve men engaged on irrigation problems for a, comparatively, very small Province. What kind of staff would you recommend for a central research station for irrigation for all India?—I do not think the staff need be very much bigger than that, because they would take up general problems, and try and co-ordinate them with the work of the local provincial staffs. I should be inclined to have the provincial staffs rather bigger than twelve. The central staff should be there mainly to co-ordinate and to see that the experiments being done in the Provinces are comprehensive, and though they may not necessarily make an attempt to carry out any of them themselves, they can throw out suggestions as a lead to the Provinces to take action in any particular direction.

58783. Should the central station deal with hydraulic questions only?—I should think both hydraulic and agricultural.

58784. Is there any common meeting ground for irrigation officers of all India?—No; unfortunately, such is not in existence.

58785. Do you think it would be an advantage if you could have a common meeting ground?—I think it would be very valuable. It is now left to the officers to attend the different local Engineering Congresses or not. There is no specific organisation to discuss specific All-India subjects at any time in one place.

58786. We were rather struck in our tour by the lack of acquaintance of one Province with the work in other Provinces?—Exactly.

58787. Do you think it would be a good thing to facilitate the meeting of engineers of Provinces?—It would be highly desirable. In this connection, I regret the disappearance of the Inspector General of Irrigation. He used to tour round and co-ordinate the work of various Provinces, and he used to inform us what the other Provinces were doing. We have no such co-ordinating agency now.

58788. On page 14 of your note, you say that you hope the more enlightened of the big zamindars will lead the way in the rectangulation of existing holdings. Would you make it a condition of irrigation?—We are doing rectangulation; we want to do sub-rectangulation.

58789. Would you make it a condition of giving them water?—We cannot enforce it where they have established rights. Where we have Government waste lands to sell, no land will be allowed to be cultivated except on condition that it is worked in 'squares' or fields of certain sizes. The Revenue Officer will see that no auction is held unless the land is properly divided up. In the Punjab some ninety per cent of the land under new Government schemes is Government waste whereas in Sind we have got twenty-five per cent only Government waste. Therefore, we have to do our improvements by persuasion, not by law.

58790. Could you give us a rough idea of the capital cost per acre irrigated of the Sukkur Barrage scheme?—Thirty rupees per acre. The value of the land will work out at about three times that in ten years.

58791. *Dr. Hyder:* What is the bearing of this custom of *mohag* on fragmentation and rectangulation? What is *mohag*?—Mohag is an indefinite right to as much land as the man can grab adjacent to his holding. I should think that is the ordinary way of describing *mohag*. It was a very important factor in the days of the Mirs, because, in those days, the Government did not construct any of the channels. Therefore, a zamindar went into virgin land and started with a canal say three miles from the river. That was very nice for the Mirs, because they could get hold of a part of the produce of that land without effort or liability, and if the zamindar wanted still further to extend the canal, they encouraged them by giving *mohag* rights. As far as one can see, the principle was that the

zamindar went on extending irrigation and using the adjacent land. That was all right in primitive days, but owing to more settled conditions now, the alleged *mohag* right has become a great nuisance. It tends to limit the quantity and value of Government land for sale.

58792. *Professor Gangulee:* Have you asked Government to get rid of it?—We hope to recognise it as little as possible in giving out the land. The gentleman who will give more evidence on the point is Mr. Dow, the Revenue Officer who is going to be examined.

58793. *Sir Chunilal Mehta:* With reference to the figure which you give on page 13 of your note about fragmentation in the Deccan, have you fixed upon five acres after any examination, or is it just an idea?—It was after examination when I served in those parts. I had prepared a scheme for Government to acquire about 40,000 acres of land near Belapur, and we found there that certain of the land was wanted for sugarcane and the rest was to be given back. I worked out that five acres would be an equitable area to give back to the people after consolidation of the holdings.

58794. That would be on irrigated land?—Yes.

58795. *The Raja of Parlakimedi:* On page 11 you suggest that demonstration should be more concentrated upon than experiment. Do you mean demonstration on the fields of the ryots?—Yes, that is very desirable. I would not do it as an experiment. I would demonstrate after I had experimented on experimental farms.

58796. After seeing the good result of a certain experiment upon a crop you may wish to see it demonstrated—Yes, follow it straight into the fields.

58797. On the land of the cultivator?—Exactly.

58798. Have you any sort of idea as to the staff which you would require to carry on that work?—No, but I should say that if the Agricultural Department is to give it its full value there will probably be required at least one demonstrator in every taluka; that would be sufficient to visit say two or three villages in a taluka centrally situated so that they could spread their knowledge to neighbouring villages to carry out these demonstration experiments.

58799. Would you not have a kind of *maistri* or people trained on the farm to see that this is carried out properly by the ryot?—Exactly, yes, trained field men.

58800. And you would have that demonstration carried out at the expense of the department I suppose?—Yes; as suggested by Sir Thomas Middleton, it would be a very good way for Government to undertake to buy the produce if the owner so desired: that is, to guarantee it.

58801. With reference to what you say on page 13 on fragmentation of holdings, have you made any calculation with a view to suggesting what area will be sufficient for a ryot to maintain himself in Sind?—Yes, we reckon that sixteen acres probably, and twenty-four acres certainly, would be sufficient to keep him in good bodily comfort under perennial irrigation. The Punjab have fixed on twenty-five acres, but Dr. Mann I know in discussing the matter held the view that I was correct in thinking that sixteen acres would be sufficient in Sind.

58802. How much dry land would be required?—In this project we allow here for eighty-one per cent of the holding being irrigated annually; that is with *kharif* and *rabi* crops.

58803. Have you got in mind the problem of preventing the formation of a layer of red stuff which is, I believe, complained of by another witness?—Yes, that is the question of salt efflorescence; it takes various forms: the white, black or red. That is a problem of drainage.

58804. You are guarding against that?—Yes, we hope to; but one of the important points is the question of distribution of water. I hold, though probably agriculturists do not agree with me, that the Irrigation Department should have full powers to deal with the economical distribution of water, because that is the main source from which waterlogging

arises. You will find in the statement I have made, and I adhere to that statement, that the greater proportion of waterlogging does not come from the main canal but from irrigation. I think that has been proved by most research officers in India. Careless irrigation produces waterlogging, and that is what we have got to get at and try to stop.

58805. To see that proper distribution is effected?—And economical water distribution.

58806. *Professor Gangulee:* Do you consider the area under waterlogging conditions to be increasing?—Not in Sind. Of course, we have no perennial conditions. We have only semi-perennial on the Jamrao Canal and there we have no waterlogging at all.

58807. *The Raja of Parlakimedi:* Have you statistics to go upon as to the requirements of each crop?—That is why we are now experimenting; we have past experience but we are now carrying out experiments at the Sakrand farm of which Dr. Mann was in charge of. I do not know whether it is in charge of anybody now; that is my trouble.

58808. Do you intend to publish that statistical information among the cultivators?—Yes, as soon as we get sufficient information. This year it has been published in a general form for the general public; we have not got sufficient information to take to the village, but from the point of view of the general public Dr. Mann has published a statement, in the last six weeks, of the result of the work up to date; it is most encouraging.

58809. That is a pamphlet, I suppose?—I do not know whether it has got to the pamphlet form yet; it was a press note.

58810. *Sir James MacKenna:* Have you formed any views on the question of what the effect of the Sukkur Barrage will be on irrigation conditions in Lower Sind outside the barrage area?—Yes, in 1921 and 1922, when this question was raised by the Lower Sind zamindars, a very detailed investigation was made by the then Chief Engineer, Mr. Shoubridge, who submitted what I considered to be a very able report. I cannot attempt to remember figures now, but he pointed out in that report that the fear was greatly exaggerated, because we have got to deal not with a question of two or three years, but with a question of a large number of years, and the delta formation of the Indus is such that between Sehwan, which is north of Hyderabad on the river and the sea, there is a constant rise in the bed of the river, and we reckon that that rise might be ten inches in twelve years; so that in itself that rise of the bed of the river will compensate for an equivalent of ten inches loss in level of the water. We are not so concerned with the quantity of water; it is the level at which it is delivered in the river which matters. We found it was not anything like as bad as it was thought to be. I undertook to give a certain amount of water from the tail of the Rohri Canal to protect garden crops in the Fuleli Canal area, and Government have undertaken in Council to spend five or six lakhs of rupees for a new head regulator on the Fuleli Canal to get better distribution. That was in addition to some eight or twelve lakhs of rupees on the Fuleli Canal to get a better discharge into the canal. The new regulator does away with most of the preventable loss in head due to afflux.

58811. So that the interests of these people in Lower Sind have not been overlooked?—They have not been overlooked.

58812. *Professor Gangulee:* Could you tell us a little more as to the functions of this central research station that you have in mind?—Each Province will have at least one research station. In the Bombay Presidency I recommend two. Those research stations will deal with what I call the domestic problems of the Province concerned: that is, the crops grown under certain climatic conditions of which they have local experience, the distribution of water, the amount of water required, reclamation of salt infected lands; the central research station could go into what I call higher research.

58813. Fundamental research?—Fundamental; and they would watch to see what was being done by the local research stations and use their

brains to see if they can initiate anything which has not been started by the local stations.

58814. The central irrigation research station will then have two main divisions: one dealing with agricultural problems in relation to irrigation, and for the other you suggested hydraulics?—Hydraulics and soil physics.

58815. Would you include the problem of lift irrigation?—Yes, experiments can be carried out.

58816. In the administration of such a central research station, would you have a representative from the Provinces?—No, I would not.

58817. Could you give us an idea of the sort of administrative body you would desire?—I would have a totally separate body whose work would be frequently visited by officers from the Provinces; it should be an entirely separate station but functioning in such a way as to bring the local research people into very close touch with all its functions.

58818. But the provincial workers would not have anything to do with the administration?—No, I do not think they should. They would only send their suggestions; otherwise it would tend to become provincial, and be cramped in scope by too much interference by the Provinces.

58819. And the finance for such a station should come from the Central Government?—Yes, it should come from central funds.

58820. Have you any suggestion as regards the situation of this central research station: at Sakrand or any of these places within the Barrage tract?—I have not given thought to the central station; I should certainly have a local one at Sakrand and one at Poona, with the central station at the most convenient centre possible.

58821. You regret very much that Sakrand at the present time is without any chief?—So far as I know there is not one. I hope there will be one soon. If there is one now it has not come to my knowledge yet in the last fortnight or three weeks since Dr. Mann has gone.

58822. With regard to the question of water supply in tracts outside the Barrage, do you think there is any scope for well irrigation?—Not a great deal in Sind because well irrigation is so extraordinarily deep, and if you have shallow well irrigation it means you have supplied the area with water from canals, and you may as well lift straight from the canals.

58823. Then you do not hold out a very great prospect for well irrigation in Sind?—Not on a large scale now.

58824. Smaller canals other than the Barrage canals would perhaps be useful?—Yes, very useful indeed.

58825. Could you tell us something about the Jamrao Canal. It was supposed to be a perennial canal, was it not?—Yes.

58826. But it did not become so?—That was due to having no barrage at Sukkur. They were very sanguine that the old Eastern Nara supply channel, which was originally a bed of the river, would carry sufficient water down to give a perennial supply to the Jamrao Canal. History has proved that to be a mistaken idea; it worked all right for the first few years; the river altered its course and there have been silting troubles and lack of discharge ever since.

58827. So that on the completion of the barrage scheme the Jamrao Canal will be a perennial canal?—Yes.

58828. It is alleged that the clearance of canals has been very much neglected by the Irrigation Department. Could you tell us what is the position?—That is a common allegation, but I would like to point out that we have done our best to explain to the cultivator that it is not a fact. In the old days in Sind scientific irrigation was not known; in fact very little of it is practised now because the canals themselves are totally unscientific. The easiest way, from the engineer's point of view to keep the people quiet, and from the cultivator's point of view, was to put a gang of men in and start digging: what they call "silt clearance". As you no doubt know, a canal has to be designed to a certain gradient,

and that gradient is fixed with reference to the soil level of the fields. It is no good digging below that level, because you will get nothing but what we call dead water. If you dig at the head of a canal you will get certain dead water and above that you will get the moving water; it is the gradient below which the canal will not work. For years, in Sind, money was spent on silt clearance; it has been considered by the irrigation officers to be an absolute waste of good money. We have always tried to go into the matter from the scientific point of view, and whenever silt clearance is advisable we have never hesitated to advise money being spent thereon.

58829. I understand from your replies that you attach a great deal of importance to lift irrigation?—A great deal, yes.

58830. In what way can the Government encourage lift irrigation?—I suggest the giving of a prize for the encouragement of the development of low lift high duty pumps. I think that is the only way. The Local Government encourage lift irrigation; so far as the Bombay Presidency is concerned, by giving a preferential rate. The lift rate is half the flow rate in Sind and the Bombay Deccan.

58831. On this question of fragmentation of holdings, you say you would like to fix five acres as the minimum area for the purpose of irrigation?—Yes.

58832. We find there are about 66,000 holdings of under five acres in Sind?—Yes.

58833. How would you provide water for those holdings?—That is a difficult problem. We shall have to do it. I personally should not like to supply water to anything under sixteen acres, but these people have got their rights and we shall have to recognise those rights and supply them with water as best we can. It is a totally uneconomic proposition from the irrigation point of view: it is wholly uneconomic to attempt to supply water down a long channel to three or four acres of land; but we have got to face the facts as they are and meet the situation as best we can.

58834. So that, is this idea of having a minimum area which you suggest a very helpful one?—Yes, we can stop that in the future. I am looking to the future; for the past we have got to deal with it as we find it; but I should certainly have a rule by which Government would not, in future, after a certain date, give water to any holding which is under a certain area.

58835. You are referring to the new settlement?—Yes, the old we have to face as it is.

58836. *The Chairman:* Do you distinguish between sub-division and fragmentation?—They are one and the same, if the members of the family happen to be at variance with one another that is the whole trouble; if they work together as a unit it does not matter how much they fragment. I know of one case in the Godavari Canals area where there were twenty-seven tenants on an area of fifteen acres, but the holding was in excellent condition because the head of the family kept the rest of them together. He did all the agriculture and they shared the profits.

58837. Is not sub-division the inevitable division which takes place if the hereditary law which is in operatoin is followed, whereas fragmentation is that which occurs when each heir insists upon having not merely his fair share of the whole but his fair share of each particle?—Exactly; of course that is hopeless. But the Bombay Government have made an effort and a Bill is being introduced now. Sir Chunilal Mehta will be able to advise you about that. An effort is being made to reduce fragmentation and sub-division.

58838. *Professor Gangulee:* In establishing the Sakrand station you had active co-operation from the Agricultural Department?—Yes, it was their scheme; I think I myself originated it, but all the work is being done by the Agricultural Department. Throughout, Dr. Mann has been in very close co-operation with me; he has seen me on every occasion he has been,

in Karachi, talked about the varieties of crops he proposed to grow, given me information and asked me if I had any further suggestions to make.

58839. *Mr. Kamat:* You think that the Sakrand station should continue for some time longer under a senior officer of the Agricultural Department?—It is not a question of a senior officer of the Agricultural Department. I should look round. Personally I do not know of an officer available in the Agricultural Department who would carry it on. I should look round for the best possible officer, pay him well and put him there to run the place, even though one got a temporary man from outside. The climate is very bad and I do not think that the ordinary service conditions would induce a good man to come. I attach the greatest importance to the proper conduct of that station.

58840. With regard to fragmentation, on the Deccan canals you at present recognise even half an acre as the minimum area for allowing canal water?—Yes.

58841. Even under existing conditions do you not think that rule could be revised with a view to avoiding excessive fragmentation?—Yes, I have advocated for the last twenty years the fixing of a minimum area that we will recognise as an irrigation unit.

58842. Half an acre you think is rather a small minimum?—Hopelessly small.

58843. And yet the Irrigation Department is continuing to recognise that as the minimum?—That we cannot help; we do not want to do it; we want a much bigger minimum than that.

58844. On page 13 of your note you say: " In the Deccan there is a large number of schemes prepared which can be taken up one by one as soon as the vital problem of how to make the Deccan irrigation pay is solved ". I should like to take advantage of this opportunity afforded by your presence here as a witness to ask you a question as to this problem of Deccan irrigation being made to pay. Are you aware of the present situation in the Deccan, that, as the rates for *gur* have gone down, it does not pay the cultivator to grow sugarcane at the present rate of Rs. 45 for the canal water, and also that if that rate is not realised by the Irrigation Department it is felt that the irrigation schemes cannot be made to pay?—I cannot agree as to the rate of Rs. 45, affecting the situation seriously at all, because it is one of the smallest items in the question of sugarcane cultivation. In Java where they prosper and are able to undercut India and send their sugar to India, they pay as much as Rs. 225 per acre for irrigation water supplied by private Dutch companies while we charge Rs. 45. The cost of manure, husbandry and of nearly all the items is bigger than that Rs. 45.

58845. Whatever the conditions in Java may be, you are aware, I suppose, of the conditions in the Deccan where sugarcane growing is being given up by the cultivators and the department is faced with the question of what to do with the water?—Again I must say that I do not think it is because the rate is Rs. 45. The situation is uneconomic, partly through the extravagant methods used in cultivation. I myself have seen it. I started the sugarcane irrigation myself on the Godavari and Pravara canals and I saw the expenditure going from Rs. 150 to as much as Rs. 850 per acre, men vying with each other to get the heavier crop, until it came to this in the end, that the sugarcane became an aquatic plant: instead of being grown on the soil it was being grown on manure and water. With the deeper rooting of the cane and more economic cultivation, I think you will find you will be able to compete with the low price of *gur* in the market.

58846. Whether the use by the cultivator of the canal water or the quantity of manure put in is right or wrong, supposing the growing of sugarcane falls into desuetude—whether rightly or wrongly on the part of the cultivator is an entirely different point, I am not going to discuss that,—have you any other paying crop to suggest for the utilisation of the irrigation water in the Deccan?—I do not see why they should not turn to wheat and the ordinary *kharif* crops and, in the black soil tracts, cotton.

I advocated the establishment of a cotton station at or near Nevasa, but nothing was done. I even suggested getting Messrs. Ralli Brothers to put up the money as they were interested in growing cotton there, but no action was taken on my suggestion. I see no reason why we should not turn to the old staple crops of the Deccan for our salvation.

58847. You think that, even assuming sugarcane does not pay, apart from the present methods being right or wrong there are other crops for which the water could be used?—I would not despair of finding other crops. It is a question of going into the economics of crops, but, speaking off hand, I should say we could turn to other crops. That would make it pay for the people but not for the State.

58848. On the first page of your note you say you are in general agreement with the views which Mr. Inglis has put before the Commission?—Yes.

58849. I think Mr. Inglis has said that it would be desirable that the Irrigation Department and the Agricultural Department should be under the same Minister; do you subscribe to that view also?—Yes, I do; I think that is very sound.

58850. With regard to roads, there are certain roads in the irrigated tracts in the Deccan maintained by the Irrigation Department?—Yes.

58851. Do you think it would be an advantage to continue them under the Irrigation Department or should they be under the local boards?—From the point of view of efficient upkeep I would rather see them under the Irrigation Department, but from the point of view of general policy they should probably be under the local boards because I hold that the irrigation engineer should confine his attention to irrigation: he has plenty to do.

58852. Do you desire to maintain this dual control?—No, not if I could find an efficient way of getting out of it.

58853. If you want to have unitary control, what would you suggest?—I personally should put the roads under the Roads and Buildings Branch of the Public Works Department where they have not been put under the Local Board.

58854. With regard to your proposal for an experimental station you would wish to see an irrigation officer attached to the superintendent of the station who might be an agricultural officer; is that your idea?—Yes. I have not looked into the question of who should be the head of the station, but there should certainly be expert research officers on both the agricultural and irrigation sides.

58855. Assuming the head of the experimental station were an agricultural officer, would you like to have an irrigation officer always attached to the station?—Certainly, the best man should be the head.

58856. To work under the agricultural officer?—Yes, certainly they should be working together. I have no objection to the irrigation officer being nominally under the agricultural officer.

58857. But in any case there must be an irrigation officer attached to an experimental station?—Exactly so.

58858. Speaking about this silt clearance in Sind, in view of the explanation which you have just now given the Commission, you think that the question of spending a certain percentage from the land revenue does not arise; is that what I am to understand?—I think it is a most dangerous principle, to earmark definite sums of money for any particular purpose.

58859. We have been told by another witness in a statement submitted to the Commission that whether the practice of clearing silt is good or bad, there is a history behind it and at one time Government adopted the practice?—I happen to have seen the written evidence to which you refer; I was asked about it yesterday and that is the first time I had ever heard that Government had ever set aside, or proposed to set aside, a definite percentage of their revenue for silt clearance: a policy to which certainly nobody in his senses to-day could subscribe, because you must look to

the actual needs of each particular situation, and not fix a definite sum of money to be spent, which would lead to gross extravagance, because persons would say: 'if it has to be spent, let us spend it'.

58860. Supposing, however, the fact were proved that Government had in the past given an undertaking to spend a certain percentage of land revenue, would you still maintain that it would be an extravagance to spend that percentage if under modern conditions that much were unnecessary for effective clearance?—Yes, exactly.

58861. *Mr. Jamshed Mehta:* You have just made the statement that the capital cost of the Barrage would be Rs. 30 per acre?—Yes.

58862. Is that based only on new land to be brought under cultivation or on the whole area commanded?—I take the whole area commanded. It is on the total area we propose to irrigate, not command but irrigate, compared with the total cost of the scheme. But the actual protection is of course on the area commanded which, in the case of the Barrage, is very nearly 8,000,000 acres, and the irrigation is just under 6,000,000 acres.

58863. I find that one of the witnesses writes: "In my opinion the detailed distribution should be left to the landholders". Do you agree with that opinion?—No, I have had very bitter experience on that point; I myself tried to encourage that co-operation in the beginning. On a certain distributary on the Godavari right bank canal I got the cultivators together and used my personal influence to try to get them to co-operate. I gave them a fixed discharge in the channel. That was the outcome of accusations of bribery and corruption on the part of my menial staff. At the end of six months the cultivators came and begged me to take it back again; most of them had had their crops damaged, there was a lack of co-operation and several men had had their heads smashed. That is my bitter experience of co-operation in the Deccan. I think it would be still worse in Sind.

58864. You have no hope of finding a *via media*, by which Government officers and landholders could co-operate in Sind?—No. There could perhaps be advisory committees, much the same as are running railways.

58865. You have spoken as to the influence of the Barrage in Lower Sind; on that Mr. Shoubridge has given a report; you say that the Government want to spend five or eight lakhs on Fuleli canal improvements?—Yes.

58866. Do you agree with Mr. Shoubridge's report on that?—Yes, in the main; there are a great many points which are hypothetical, as there always must be in dealing with the future; but as far as I can see he has been very sage in his judgment and moderate in taking figures for both sides of the argument.

58867. But I suppose you know that the fear of the Lower Sind zamindars still exists to a great extent?—Yes.

58868. Do you think that if all these things fail Government will be immediately prepared to take action?—I feel certain Government must protect their interests: that undertaking was given in the Legislative Council in 1923.

58869. I take a statement made by you on page 13: you also feel that beyond the Lloyd barrage scheme other schemes are very necessary; "In Sind there is still scope for very great improvements in the irrigation of the area outside the Barrage Canals zone", and Government will have to take up future developments?—Yes.

58870. Are these schemes before the Government?—One or two are practically before Government, and others have to be worked up. The Marani project is practically complete in its final state and that has to go up to Government.

58871. May I take it as definite that Government has appointed a staff of engineers to work out the scheme?—That has been done in the Karachi canals district but not elsewhere in Sind. Each officer takes up such work as he has time and according to his keenness.

58872. *Sir Chunilal Mehta* : In connection with this silt clearance problem, there is also a question of reduction of *karia* heads, is there not?—Yes.

58873. Can you throw some light on that question?—Yes, I will put it in as few words as possible. A *karia* is a water channel, that is an expression used in Sind for a water channel leading to a zamindar's field from the main channel. In the days of the Mirs the landholder dug a hole in the canal bank, cut his channel and took his water. When he found he was getting less water, he widened that opening. That process went on; that zamindar, who was probably a small man when he started, through having lashings of water got very powerful, his opening got wider and wider and the man further down got less and less water. As a consequence, we found after a review of the situation that the zamindars at the tail of these old canals starved whereas the zamindars at the head were very prosperous indeed. We find most of them are " representatives " on the Legislative Council; the representatives of the people of Sind are mostly gentlemen who own lands at the heads of canals. I think cause follows effect in that case, but I cannot see how they can represent the true interests of the man at the tail. We have been trying to protect the smaller zamindar at the tail. For that purpose we have introduced what we have called the proportionate module; it is a masonry outlet or opening which will give a proper proportion of the discharge of the water passing in the canal at each point to everybody concerned; that is to say, if a man has so many acres of land, we say he shall have so much of that water which is passing. We make this module and indicate what the depth of water passing in that channel is within certain limits. By the time we get to six inches depth it does not matter who gets it because it is hopelessly inadequate; but within certain limits everybody gets his proper share, within five per cent of accuracy of the water passing through that channel. As a consequence we have had to limit the amount of water taken by very big zamindars at the heads of these channels. They say we are robbing them of water : we say we are taking back some of the excess water that they have enjoyed for years. That is a conflict of opinion that I am afraid must go on between the man who owns the land and the officer who has to distribute the water. That is the controversy as it is at present. It will lose a great deal of its importance in Sind because two-thirds of the irrigation of Sind will come under the Lloyd Barrage. Under that scheme every outlet will be moduled because we propose to have a regular supply of water in all the canals and as a consequence we must see that everybody has his proportionate share of water which will be his full share. It is not necessarily his full share at present but it is his share of, probably, an inadequate supply of water. I think that is as succinct as I can put it.

58874. It has been claimed that an experiment was made in the presence of the Irrigation Member which supported the contention put forward by some of the landholders; is that a correct statement?—I should think it is wholly incorrect; I have seen the written statement but I had not heard of it before.

58875. It has also been claimed, as was pointed out by a member of the Commission, that Government undertook to spend a certain amount of the land revenue on silt clearance. Reading the evidence, it appears that it was not silt clearance but maintenance of canals?—Yes, that is a very different proposition.

58876. Can you give us any idea as to the proportion of land revenue that you spend on the maintenance of canals?—On some canals it is practically the full revenue, a hundred per cent, I am sorry to say; but in other cases I should say thirty or forty per cent is a very common figure : very heavy charges indeed.

58877. Considerably more than the sixteen per cent?—Yes.

58878. You also said, I think, that in the Deccan it is possible to divert the irrigation water from sugarcane to other crops?—I said I hoped it would be possible; it is a line of investigation.

58879. You have not any facts in your experience which would lead you to think it would be not only possible but economical?—I say it may be economi-

cal from the point of view of the cultivator, but never from the point of view of Government; the canals will never pay if sugarcane is given up, but the cultivator could prosper.

58880. Would it involve a very considerable expenditure in extra canals to give water for crops such as you mentioned?—It would mean a much more detailed distribution, yes.

58881. It is not certain that a cultivator would take that water: he would prefer to take his chance with the rain?—Exactly; that was my difficulty when we started irrigation in those tracts: they gambled on the rain, and then when it failed they came in their thousands to ask for water, all on the same day.

58882. Cotton does not require very much water in the Deccan, does it?—No.

58883. So that the chances are that cultivators may refuse to take the water at all?—Certainly; but Government might consider puting on an insurance cess on every acre whether they take the water or not, and that would make them take the water at the proper time and get a better crop than if they gambled on rain.

58884. Would you force them to pay the insurance cess?—Certainly; we all have to insure our lives, why not insure our crops?

58885. Could you say in how many years the cotton crop fails?—Sometimes for four or five years continuously it has failed. I knew of three years of either scarcity or famine in the eight years and three months I was at Kopargaon in the Pravara Canals division. The country was absolutely black in its bareness; oil seeds were grown but not cotton.

58886. That was in the Ahmednagar district?—Yes.

58887. *The Raja of Parlakimedi:* When fixing those division dams you have just mentioned, if there are estates that do not possess survey records, how do you fix your area for irrigation?—We find out the area that is established on that channel from the revenue survey records.

58888. There are estates where a survey is not held?—We should have to hold it ourselves, but that is very exceptional, probably only in *jagir* lands. In *kabuli* lands it is known to the Revenue and the Irrigation departments exactly what crops have been irrigated and the exact extent of them.

58889. To get the revenue upon those?—Exactly.

58890. *Mr. Calvert:* We have been told that the Indus is at a higher level than the land eastwards?—Yes, and westwards.

58891. How do you intend to dispose of your drainage water? It cannot flow back into the Indus. Will you pump it back?—It can flow back into the Indus.

58892. How can it flow up?—We take it at a flatter gradient; one of our main drains takes off near a place called Mehrabpur and we let it back into the river above Hyderabad. We give a flatter bed slope to our drains than that of the river.

58893. You will not need to use pumps?—No; there may be one or two local places round the Mirpurkhas area where we may have to use pumps.

58894. *Mr. Kamat:* To revert to this question of sugarcane in the Deccan: if sugarcane is given up, that means a set back to the extension of irrigation in the Deccan?—Yes, it will, unless it is run on philanthropic lines.

58895. Do you think it would be an economic proposition for the cultivator to pay Rs. 45 and yet to grow sugarcane at a profit?—Not under present conditions. I say that from my experience. A lot of alterations have been made in the last nine years since I left that area, but nine years ago they were getting very big incomes from their crops and they did not mind what they spend on producing the crops; Rs. 800 and Rs. 900 was a very common expenditure and they were getting Rs. 1,200 and Rs. 1,300 per acre for the crop.

58896. Is it a method of wasting the manure?—I think it is wasteful in all directions; that is why I want to see greater research made into the question of sugarcane cultivation.

58897. As to the allegation that they waste water over the sugarcane, is it also true, as has been alleged in some quarters, that they over-flood their sugarcane because they are not sure of getting their turn of water from the department at regular intervals?—I should think that is highly improbable as a cause, because the canal is run as a perennial one. I never had a case like that. I put it down mostly to gross carelessness. In Sind when the water is non-perennial, excessive watering is the practice: a bird in the hand is worth two in the bush but in Sind we shall have the bush birds in the hand in the future.

58898. In Sind the distribution is less complicated than in the Deccan?—Yes, because holdings are bigger.

58899. Not because of the module system or anything of that sort?—No.

58900 Is it not possible to increase the efficiency of the Irrigation Department with regard to the regularity of the intervals of supplying water for sugarcane? Is there no possibility of any further improvement in that direction?—Yes, if it is proved by the experts to be necessary you could make your intervals anything you like. You might have to make your canals bigger. If it is proved to be necessary to have an interval of seven or eight days, the Irrigation Department will have to give water every seven or eight days.

58901. If you could ensure absolute regularity of the distribution every ten days, or whatever it may be, there is the chance that the cultivator may not use the present amount of water?—Yes, but of course the chances are remote with a greedy man. If you or I have ten rupees in our pocket and we think there is a likelihood of getting a further ten rupees later, we soon spend that money. That is improvident, but I am afraid we can never get over that in the Deccan; I have seen too much of it.

58902. *The Chairman:* You mentioned, a few moments ago, the post of Inspector General of Irrigation: you said that in your view that officer did do certain things which were very useful. Amongst other things, he kept Province in touch with Province. Under present conditions and under the existing circumstances, can you conceive of an officer being able to carry out that work and to perform those functions in the position of Inspector General of Irrigation?—I certainly think so. I have been surprised all along that it has ever been abolished. I have never seen any reason for its being abolished. There has been a certain amount of inter-provincial jealousy over the appointment, but, if it is looked at impartially, an Inspector General is worth untold wealth to the country; any little thing he might tell us might save lakhs of rupees in design or matters of policy.

58903. In post-Reform conditions he would, of course, have no authority in a Province?—No, he would be advisory.

58904. Do you think that he would be welcome?—Yes, I think he would be highly welcome.

58905. Would he be in a position of sufficient authority in the Province to carry out the inspections without which it is difficult to see how he could carry on his work?—It would be an extraordinary policy for any Local Government to attempt to prevent his coming round and inspecting their different areas. He would have no executive authority, but the fact of his visiting us in the Provinces would, I think, be valuable; I have felt the lack of it very much since the post has been abolished.

58906. Speaking from your own experience of the agricultural research station, so far as the work of that station touches upon your subject, have you formed any view as to whether Sakrand, and any other stations which may be set up, can well be conducted by an officer resident at Poona, or do you think that there should be a separation of responsibility and an officer in charge in Sind?—I should think it must be entirely separate: the conditions are so totally different that any idea got from research in Poona would probably be of little use to Sind and *vice versa*.

58907. Are you satisfied with the circumstances of the research station and with the work of the Agricultural Department so far as you have seen it and from your own point of view?—At Sakrand?

58908. Yes, and in the Province generally?—Yes, I think I am, on the whole. I have made a point in my note which I do not know whether you have noticed, and that is as to the question of the personality of officers.

58909. Yes, I noticed that?—To that I attach the greatest importance. I have known officers who have been most erudite in research and keen on their profession who have been no use at all in going out and instilling these ideas into the minds of the people. I have in mind one officer who used to be Director of Agriculture in the Bombay Presidency who was a born agriculturist, a farmer by profession and a farmer by birth; that officer used to get into the closest touch with the cultivators, which I do not think is the case when we attach too much importance to the academic side of an officer's qualifications.

58910. Do you think that full use is being made of the silt in the Indus from the agricultural point of view?—Yes; but so far as the old bad canals are concerned a great deal of it has been dropped on the way.

58911. Will your canals carry it straight on to the fields?—Yes, we want nothing to drop in the canals other than silt in the berms; after that, everything is to go on the land, and we have to calculate our velocity of water to give that effect; the silt must go on the land.

58912. That should be a very valuable contribution to the fertility of the Province?—Yes, extremely.

(The witness withdrew.)

APPENDIX I.

Statement showing the average working rates of the dragline Excavator machines working in the Lloyd Barrage.

Serial No.	Type of Machine.	Maximum reach and capacity of corresponding bucket.		Minimum reach and capacity of corresponding bucket.		Working average rate per 1,000 cubic feet.	Average depreciation per 1,000 cubic feet.	Total all inclusive rate per 1,000 cubic feet.	Remarks.
		Reach in feet.	Bucket in cubic yards.	Reach in feet.	Bucket in cubic yards.				
1	2	3	4	5	6	7	8	9	10
						Rs.	Rs.	Rs.	
1	Class 320 Bucyrus Steam Machine .	155	5	120	8	7·13	3·75	10·88	
2	„ 300 Ruston „ „ .	155	5	100	10	8·40	3·30	11·70	
3	„ 135 „ „ „ .	70	4	70	4	5·37	3·00	8·37	
4	„ 20 Bucyrus „ „ .	70	3	70	3	8·74	3·48	12·22	
5*	„ 50 „ Diesel „ .	55	1	45	1½	6·62	2·17	8·79	* Caterpillar mounted. All types can, however, now be mounted on caterpillars. All machines are self-propelled.
6*	„ 30 „ „ „ .	45	¾	40	1	4·78	1·63	6·41	

Note :—(1) Separate rates have been given for each type of machine as the rates of depreciation differ in each case.
(2) The rate of depreciation depends on the assumed life of the machine. These machines were all purchased for construction work which fixes a definite period during which their full value is written off. Machines purchased for maintenance work would be given a much longer life and depreciation charges would therefore be on a lower scale than that shown in column 8.

APPENDIX II.

Details regarding types of carts.

Description.	Diameter of wheels.	Width of tyre.	Load carried.	Gauge.	Life.	Remarks.
(*a*) Ordinary bullock cart as used in Sind.	2′ 6″—2′ 9″	4″ (bevelled on edges so as to reduce the width of tyre to 2″—2½″).	12½ Maunds	4′	6 years	An iron tyre 2″ wide is fitted on the wheel on the carts that have to travel mostly over metalled roads.
(*b*) Bullock carts used in Sukkur for carrying bricks.	3′ 8″	4″	250 bricks as against 120 bricks carried by ordinary bullock carts.	5′	8-10 years	As these carts are used on metalled roads in Sind, iron tyres 4″ wide are fixed to their wheels.
(*c*) Bullock carts as used in the Punjab.	4′ 4″	5″	40-45 mds. on metalled roads. 25-30 mds. on earth roads. 20 mds. on sandy tracks.	4′	The main body lasts from 15 to 20 years, but wheels require renewal every 3rd or 4th year.	An iron tyre 2″ wide is fitted on the wheels when the carts have to travel mostly over metalled roads.

Mr. H. DOW, Revenue Officer, Lloyd Barrage and Canals Scheme.

Replies to the Questionnaire.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(*b*) and (*c*) (1) Demonstrations have little effect on the cultivator unless he is convinced that they are carried out under the same conditions that apply to his own land. Model farms where the Agricultural Department have separate watercourses and a special water supply, expensive machinery and unlimited labour, do not make much appeal to him, for he is generally quite convinced that he could, without any special knowledge, get just as good results as the Agricultural Department if he were given the same conditions.

(2) The best demonstrations are those that take place on a cultivator's own land. The Agricultural Department should demonstrate their improved methods side by side with fields worked by the cultivator himself, under an agreement to hand over to the latter any additional gain due to their superior methods, and undertaking to make good any loss. The cultivator will not be slow to adopt simple improvements when he is sure there is money in them.

(3) Officers who are really interested in agriculture and rural economics do very useful work by stimulating the interest of others in the course of their tours.

(4) In Sind, further propaganda work seems to be necessary. One frequently comes across important zamindars who deny, with obvious sincerity, all knowledge of what the Agricultural Department in Sind is doing. The taluka development associations are capable of doing good work but need more funds, and it will probably be necessary to keep them from falling into the hands of tuft-hunters and *veranda-wallas* who are themselves bad zamindars.

(*d*) *Successes.*—(1) Introduction of improved ploughs into the Jamrao area.

(2) Establishment of small fruit and vegetable gardens throughout the same area, largely owing to the personal influence of various colonisation officers and engineers.

Failure.—The case with which I was most familiar was the Daulatpur Reclamation, in which it was attempted to reclaim a large area of *kallar* land in Mirpurkhas taluka. The main methods were copious washings and rotations of crops and the land was finally declared to have been reclaimed (about 1915-16). The local zamindars and cultivators maintained that the land which was fairly good at first had been improved owing to the copious waterings and croppings, and were quite convinced that with the same supply they could, and would, have improved it in the same way and to a greater extent, whereas the worst of the land was never cropped and remained quite unfit for cultivation. This enterprise of the department was, I believe, meant to be experimental and not by way of demonstration, but it actually brought the methods of the department into considerable local disrepute because the department maintained that the land had been reclaimed when it was common knowledge that little improvement had in fact been made.

QUESTION 4.—ADMINISTRATION.—(*a*) Provinces tend to become watertight compartments, and the officers of one Province know very little of what is going on in the next. The result is that in one Province there is much waste of time in discussion and experiment over problems, without the knowledge that there is on record, in other Provinces, the experience which renders such discussion and experiment unnecessary. Most revenue and irrigation officials in Sind know no more about the revenue and irrigational problems of the Punjab than they do of those of Timbuctoo. Government should encourage officers to visit other Provinces unofficially for short periods to make themselves familiar with what has been and is being done there. The cost to Government in travelling expenses is negli-

gible in comparison with the benefit which any officer with a flair for his subject derives from such an extension of his horizon.

(*c*) (1) The Veterinary Service is so small that its effect on the agricultural life in Sind is hardly discernible.

(2) More feeder railways will be urgently necessary in Sind for the development of the Lloyd Barrage area. These are now under consideration.

(3) The improvement of roads, and more particularly of culverts, is necessary. The load that a bullock cart can carry over a given length of road is conditioned by the worst crossings that have to be negotiated. The improvement of roads would, in my opinion, justify greater recourse to the re-imposition of tolls, in spite of their objectionable features.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—

(*a*) (*i*) *Causes.*—

1. Extravagant social customs.
2. Capriciousness of the inundation season.
3. Ignorance. The cultivator cannot properly distinguish between capital and income.
4. Priest-craft.
5. Poverty and prosperity. This is not a paradox, for both, in alliance with ignorance, lead to uneconomic borrowing.

(*ii*) *Sources of Credit.*—

1. The land.
2. Character. My experience has been that an honest cultivator, even with his land on restricted tenure, can borrow the limited sums which he needs for cultivation at rates as favourable as others who hold on full tenure.

(*iii*) The same as under (*i*).

(*b*) and (*c*) The further development of co-operation seems the most promising method of decreasing uneconomic borrowing. Legislation on the lines of the Punjab Alienation Act would have a salutary effect in restricting the credit of the more extravagant.

QUESTION 7.—FRAGMENTATION OF HOLDINGS.—(*a*) The fragmentation of holdings is not very serious in Sind, because the land is usually enjoyed in undivided shares. But holdings are often scattered, and are of uneconomic shape. It is hoped to remedy this to some extent in the Barrage area by the introduction of the rectangular survey.

(*b*) The chief difficulties are conservatism and suspicion. The possibilities of tackling the question along the lines followed by the consolidation of holdings co-operative societies in the Punjab is now being investigated.

(*c*) Not at present.

QUESTION 8.—IRRIGATION.—In my opinion, insufficient attention has been devoted in Sind to the problem of lift irrigation by means of pumping schemes. There are many places in Sind where a perennial supply is available from large *dhands*, such as the Manchar, from *dhoras* and from the river itself, and only requires to be pumped a few feet to irrigate large areas of land. I do not think it has ever been satisfactorily demonstrated that this cannot profitably be done on a large scale, and the experience of the Punjab seems to indicate that it can. There are some zamindars who have installed small pumping plants in their own lift lands, and find themselves amply remunerated by getting, as their share, *batai*, or one-half the crop (as for flow land) instead of the third share which they would get for ordinary lift land. In these circumstances I find it very difficult to believe that pumping cannot be profitably carried out by Government on a large scale.

The matter is of great importance from the point of view of the Barrage, as there are large unoccupied areas of good lift land commanded in some parts. These will have very little sale value for many years unless they can be turned into flow (so far as the zamindar is concerned) by a pumping scheme. It is also important because of the number of cattle which would be set free for field work as, during the early years of development of the Barrage area, there may be some shortage of cattle.

QUESTION 10.—FERTILISERS.—(*a*) Artificial manures are too expensive for the cultivator, and he is fuly alive to the value of ordinary animal manure. Much however of the latter is wasted, because it is not properly collected and stored. Animals are driven into the jungle for grazing during the day and no attempt made to collect their dung, and they are herded together at night within village enclosures and their urine almost entirely wasted. Zamindars ought to pay graziers to fold goats, sheep and cattle in their fields. In certain districts of the Punjab, zamindars are willing to pay one rupee per night for every hundred goats folded on their land.

It is sometimes too readily assumed that in any case only a small minority of the lands can be manured by animal manure. It has been estimated that two thousand goats are sufficient to manure one acre of land in a single night. There are in Sind over a million goats and over half a million sheep whose manure is equally valuable, *i.e.*, enough to manure annually 270,000 acres of land. A very much larger area still could be manured from the more bountiful excrement of horned cattle, of which there are nearly two millions in the Province. In other words, a very large proportion of the three-and-a-half million acres which are now annually cultivated in Sind can be satisfactorily manured from the agricultural stock of the Province.

(*d*) It is my impression that throughout Sind the value of manuring is much more generally recognised than it was fifteen years ago, and the difference in value of different manures is well understood. The richer nitrogenous and phosphoric content of goats' dung and sheep dung is recognised by its greater use for the more expensive crops such as vegetables and sugarcane, and night soil and poudrette which is available in limited quantities near large towns is also used for garden crops. Dried blood from slaughter houses, and dried fish where available, are used mainly for fruit trees. *Kallar* earth and earth collected from old abandoned village sites are frequently used as a top dressing for cotton, *juari* and wheat, and ordinary cattle manure is freely used for all crops.

(*f*) I do not think anything can be done to discourage the practice and it is not practicable to forbid it. The value of cowdung as manure is fully realised, but it is also valued as fuel for its slow burning and facility of storage. The extent of its use as fuel or manure depends on demand in any particular area.

QUESTION 11.—CROPS.—(*c*) American cotton. Hitherto, owing to the unstable conditions of water supply, the introduction of long-stapled varieties of cotton has been rather an up-hill fight, and the Agricultural Department has in consequence had to divide its energies between the improvement of Sind *deshi* cotton and the introduction, or production by hybridisation, of long stapled varieties suitable to the Province. I incline to think that with the near prospect of a perennial supply in the Barrage area, the department might now leave Sindhi cotton to look after itself, and concentrate on the long stapled varieties. I would even go further, and suggest concentration on one type, 4F, which is the most satisfactory of the Punjab Americans and has been proved to be capable of giving good results in Sind.

Perhaps more might be done to interest co-operative credit societies in the distribution of good seed, particularly wheat and cotton.

QUESTION 18.—AGRICULTURAL LABOUR.—(*a*) No measures are necessary, I think. There are very few zamindars who do not find it possible to expand their cultivation considerably during a really good inundation season. Labour easily gravitates to where it is wanted most, particularly in Sind where the *hari* has no permanent interest in his land.

(*b*) Some doubts have been expressed as to the possibility of the existing population of Sind being sufficient, or being likely to expand rapidly enough, aided by moderate immigration, to bring the new Barrage lands under cultivation within a reasonable period of years. I do not share these doubts. Those who express them make, I think, insufficient allowance for the large area that will be turned from lift into flow, thus requiring fewer cultivators; for the long periods of idleness which the present uncertain and restricted season enforces on cultivators; for improved methods and organisation, and especially for the stimulative effect on population of a period of agricultural prosperity and development. The population of the Lyallpur district had decreased from 40,000 to 30,000 in the decade before the opening of the Lower Chenab Canal. It has now a population of over 1,100,000, of whom about half were born in the colony; and the most prolific families are those of the old Jhangli inhabitants who were a dwindling race before the canal brought them prosperity.

QUESTION 22.—CO-OPERATION.—(*b*) (*v*) I hope that it will be found possible to tackle the question, in Sind, of fitting the present irregular holdings into the rectangulation survey with the aid of co-operative credit societies formed on the model of the consolidation of holdings societies in the Punjab. Two officers have just been deputed to make a careful study, in the light of Sind conditions, of the work being done in the Punjab.

(*vii*) Joint-farming societies would, in my opinion, be entirely premature in Sind, and likely to bring discredit upon the co-operative movement generally. There would be little hope of them being run honestly, or disinterestedly. The history of the few landholding co-operative societies in the Punjab is not encouraging.

(*c*) Yes. I should certainly be in favour of legislation to compel a recalcitrant minority to join in any such co-operative scheme. There are differences of at least a thousand years between the general outlook and development of different individuals in a Sind village, and there always will be a minority (where there is not a majority) against any co-operative scheme of improvement.

(*d*) I only had detailed personal knowledge of one society, some dozen years ago, when the co-operative movement in Sind was in its infancy. The leading men of the society certainly achieved their object, which was that of borrowing the whole funds of the society and not repaying them.

QUESTION 23.—GENERAL EDUCATION.—(*b*) I have no experience of the matter but I feel that schools with an agriculture bias, if properly run by trained teachers, should be capable of doing much good, both to the boys and indirectly to their parents.

I think the ordinary readers in use in elementary schools might be more descriptive of the things which boys see, without really attending to, every day. Nothing holds a boy's attention so much in a book as a description of some thing which he thinks he knows all about already. Many of the simple facts of agriculture could be rubbed in in this manner. I am told that the Sindhi readers, although frequently revised, still contain nothing whatever about the Lloyd Barrage scheme, which is now in process of revolutionising the lives of half the agricultural population of Sind.

QUESTION 25.—WELFARE OF RURAL POPULATION.—(*b*) Government really cannot afford to undertake this work, though the results of such economic surveys would be most valuable. They are of no use unless they are really the work of a well-educated, trained and conscientious observer, and they take a great deal of time to do properly. In a more developed country such work is done by large numbers of private individuals, out of personal interest or devotion, and is produced in such masses that the principal defect, prejudice, can be readily discounted. In India the usual fault of such work is political bias, but there is improvement in such work owing, perhaps, to the fact that politics in India is no longer the simple business of opposition to Government that it was a few years ago. There is very great scope for such surveys in Sind, where it is hardly too

much to say that at least half of the agricultural statistics are little but guess work.

QUESTION 26.—STATISTICS.—(*ii*) The figures of yield, as given in the Agricultural Statistics for Sind, are generally admitted to be unreliable. Some of the figures for the Karachi district were till recently (I am not sure whether they have now been revised) fixed on the authority of a casual demi-official letter from a Collector of early Victorian days who got them by questioning a local zamindar. I think they require to be brought up to date by extensive crop experiments. The difficulties of obtaining the figures indirectly, from estimates of consumption, carry-over, export and import, are very great. I had much experience of this matter during the War, as Assistant to the Commissioner in Sind for Civil Supplies, and my opinion is that there are so many unknown factors which have to be estimated, and the margins of error are so wide, that the indirect method is quite unreliable, especially in the case of food grains.

(*iii*) The figures for Sind are, I suspect, quite unreliable. Concentration of effort over a limited area would probably give more reliable results.

Oral Evidence.

58913. *The Chairman:* Mr. Dow, you are Revenue Officer, Lloyd Barrage and Canals?—Yes.

58914. Your headquarters are at Karachi?—Yes.

58915. What length of time have you held this post?—I have only held this post from the 1st of January this year. Before that I was for a year Financial Adviser to the scheme; out of 17 years of service I have spent about 11 years in Sind as revenue officer and on other miscellaneous work; I first came to Sind in 1910, and I have always been in and out of Sind since then; my longest period out of Sind was three-and-a-half years in the Finance Department.

58916. What exactly is your own responsibility at this moment? Are you formulating schemes for the colonisation of those areas which are to be newly irrigated?—Yes; I am in charge of everything except the actual building and construction of the Barrage and Canals, with which I have nothing to do; except that I am acquiring the land which is wanted for the digging of the canals; I am to be responsible for the land sales, and generally, I suppose, for securing the financial success of the scheme, so far as it depends on the receipts.

58917. We have not seen the Government scheme of colonisation of the areas; is it in existence?—No; there is no definite scheme in existence. It is rather too early to formulate a scheme of any definite nature.

58918. When do you expect the water to be flowing down the canals?—I understand the engineers hope that the water will be flowing by March 1931.

58919. How soon do you anticipate that the sale of the lands will be begun?—As regards lands which it is proposed to sell by auction or to sell in any other way at full rates, it does not seem to be of much use to attempt sales until we are in a position definitely to assure the purchasers that water will be ready on a certain date. At present there are good hopes that it will be ready by March 1931, but I do not think even the most sanguine of engineers would like to make a very definite statement that that date will not be delayed, and I do not think that you can hope to get anything like the full price until two years before the water is ready.

58920. On the other hand, you have to wait longer for your money?—Yes; it is a matter of arithmetic to work out whether we are likely to lose more by selling in advance than we would have in interest charges. We are paying interest on borrowed money, and by getting in our money in advance we should borrow less and so pay less by way of interest.

58921. I suppose the area to be irrigated is actually divided into two classes, that which is already owned and occupied, and that which is virgin land which will be cultivated for the first time as a consequence of irrigation?—Not altogether virgin land; some of the land which is still Government land has been cultivated on temporary leases; *eksali* and *panchsali* (let for one or five years), and in many cases these temporary leases have been extended from year to year, up to as much as fifteen years sometimes.

58922. Do they present obstacles to sale as freehold?—Some concession will have to be made undoubtedly in respect of some of them. In some cases virtual promises of permanent grants have been given; in other cases they are purely temporary. For example, this year in consequence of the floods a large amount of land has been given purely for temporary cultivation. I think all these cases will have to be gone into individually. But they do not amount to a great deal; they amount in the whole area to a little over a lakh of acres.

58923. Where the land is with Government, is it the policy to encourage ryotwari colonisation or zamindari?—I do not quite follow the distinction you draw between them; is it merely a difference in the size of the holding or in the nature of the tenure?

58924. In the size of the holding?—I imagine that Government will, as far as possible, want to encourage the smaller holder; I am certainly very much in favour of doing that as far as possible, and I think it is possible. Sind is already very largely a country of small holders. The number of holdings in Sind of over 500 acres is less than 2,000, and 75 per cent. of the holdings are under 25 acres; 36 acres is the average size of a holding for the whole of Sind.

58925. Would you call that a very small holding?—Under present conditions it is small.

58926. But not under conditions of perennial irrigation?—Under perennial irrigation that is still not a very large holding, but it is well above the minimum economic holding.

58927. Holdings over a hundred acres constitute about seven per cent of the total; is that approximately correct?—Yes, about seven per cent. In some districts the average holding is already very small; in the Sukkur district it is about fifteen acres.

58928. Is it proposed to sell the land at auction or at fixed prices?—No definite decision has been taken by Government.

58929. What is your personal view?—My personal view is that both systems may go on side by side; there are advantages in each. I should certainly prefer to sell the very best of the lands in the largest blocks by auction. But a system of selling by fixed prices has many advantages; it would enable the work of land distribution to be carried on more evenly throughout the year, which is an advantage where staff is limited. They have tried both systems in Bikaner side by side, and each has its advantages.

58930. Do you contemplate any scheme for the financing of purchases by small men?—I certainly contemplate that purchasse will be made by instalments, probably up to eight or ten instalments, and I think co-operative societies might do useful work in aiding purchasers.

58931. There is no proposal to provide any *ad hoc* machinery of credit other than what is supplied at present under the existing acts?—No, no proposal has been made.

58932. Has any suggestion been made that a certain number of large blocks of land might be leased for a certain number of years to corporations or individuals in order, amongst other things, to demonstrate the advantages of improved cultivation to the neighbourhood as a whole?—I have not had such suggestions made to me.

58933. What is your own opinion on that point?—I think that certain areas of land should be leased for periods when we are not prepared to sell outright. That, I believe, is commonly done at present in the Punjab; land which is not considered ripe for sale is leased out for periods of varying lengths; sometimes bad land is leased with a view to getting it improved.

58934. I was thinking rather of the leasing of a sufficiently large block of land for a sufficient number of years to attract capital, either Indian or European, so that all the advantages which come from progressive methods might be tried out and advertised in the district. That has taken place to some extent in the Punjab, and the balance of advantage may be in having a certain number of such blocks?—I am getting a certain number of applications, at any rate nibbles, from people who want large estates for particular purposes, fruit-growing, cattle-breeding or something of that kind, with a view to bring various advantages to the State and incidentally to benefit the individual making the proposal. But I understand that in the Punjab, Government have now come definitely to the conclusion, in connection with their latest irrigation projects, that such applications ought to be discouraged.

58935. No final decision has been taken; is that so?—No final decision has been taken here.

58936. Has any suggestion been made to put upon the purchaser or the cultivator of land to be irrigated under the Barrage scheme any restrictions as to the methods of tillage, the adoption of improved varieties approved by the Agricultural Department, and so on?—You mean on the conditions of his tenure?

58937. Yes?—No such proposal has been made.

58938. Do you consider it advisable?—I should think not.

58939. For what reason?—Generally because of the impossibility of enforcing such conditions applying to a large number of people in a large area with practically no establishment which you can rely on. I have had some experience of that; I was for three years on the Jamrao Canal which was largely colonised by small holders from the Punjab and from Sind, and various conditions regarding building of *pucca* residential houses were supposed to be imposed. They were very irregularly enforced; provided the tenant kept on the right side of the local officials, he was fairly safe, but if he fell out with them then he was fairly sure of being reported for these things. I moved in the matter when I was there, and I think those conditions have now been abolished. Even as regards the Jamrao they were very difficult to enforce consistently.

58940. There are certain attractions in providing such a scheme; you get a large block of one improved variety of this or that crop; the difficulty of preserving the purity of the strain is done away with, because of the absence of the risk of cross-fertilisation and also you get a sufficient volume of produce of improved quality to ensure a premium in the market? —There are certain advantages if you can enforce those conditions; but there is no advantage in making rules which you do not enforce. In that particular matter of seed, I think the cultivator in Sind is beginning to realise the value of having good seed, and I think that is one of the most promising ways in which the Co-operative Department and the Agricultural Department in combination can help the cultivator.

58941. What about the need for arranging, in the beginning of things, for irrigated plantations to provide firewood; have you any views on that? —The Forest Department will doubtless want certain land and possibly give up others; but are you referring to small scattered plots in the actual villages?

58942. I want to know whether you have any ideas, big or small, about it?—The fuel problem is not so acute in Sind as it is in many parts of the Presidency.

58943. Do you not expect an enormous increase in population as a result of the Barrage?—No, not a large immediate increase. I think our scheme in Sind is rather different from any of the Punjab schemes. In the Punjab, when they have undertaken a scheme, they have always concentrated on large blocks of vacant land. But the Sind scheme is designed mainly in the interest of existing zamindars. Almost in every part we have a nucleus, sometimes too big a nucleus, of people, and the land we are going to give out consists for the most part of small plots dotted here and there amongst existing holdings, so that the whole area is very largely already provided with villages, plantations, roads and so on, which require development rather than organisation *ab initio*. So it is really only a question, in the matter of plantations, of developing existing arrangements. There is already in Sind a system by which anybody wishing to grow a *babul* plantation gets a certain number of years free of charge and then gets light rates of assessment. *Babul* groves are frequently grown for about ten years or so with a view to replenishing the soil when the soil is exhausted, and are then cut down.

58944. Surely, in colonising Government land, where you have probably no vested interests to speak of, if it were in thirty years' time found that there is a shortage of firewood, it would greatly be regretted then that early provision had not been made for growing a certain amount of firewood at the early stages?—Yes; but what I mean to say is that we

have got that system in force, and that it is only a question of encouraging a system which is indigenous.

58945. Not merely on land in the hands of the zamindars, but also on large blocks of Government land?—Any land which is given out as new land can be allotted subject to some similar conditions; low rates can be fixed for growing fodder and timber.

58946. What is the actual relief in rate for fodder growing?—It varies in different areas according to the other rates. But natural grass can always be grown with the aid of canal water for a rate of twelve annas per acre.

58947. Speaking about the existing customs, would you tell the Commission anything about the system of *mohag*?—The word '*mohag*' merely means frontage. Now, the zamindar's ideal of his *mohag* (to take an extreme case) is all the Government land which with the aid of a powerful telescope he can see by standing on the highest portion of his own land; and the extent to which it has always been recognised by Government is this: any land *in* the frontage of one zamindar which cannot be granted to another zamindar without injuring the former's rights of user or access to *his* existing holdings.

58948. Must the land claimed be contiguous to the man's own holding without the intervention of any other lands?—Yes; it must be contiguous. I should have explained that *mohag* is not in any sense a legal right; it has never been recognised as such, nor has it, I think, been claimed to be a legal right. Between those two interpretations there is room for a great deal of give and take. It depended in the past a great deal upon the conditions of irrigation and the personality of the officer in charge and so on. When the land was not particularly valuable and the zamindar would be involved in a good deal of expense in bringing it under cultivation, naturally his right of *mohag* was recognised to a much greater extent; in fact there have been very often no other claimants.

58949. Is *mohag* not founded on the conditions attaching to inundation irrigation?—Yes; I think it is entirely so.

58950. In normal years a man could only get a certain amount of water, but in a season of high floods, if he wished he could take full advantage of the water and extend his cultivation over all the unoccupied land contiguous to his holding?—Exactly. Of course if a zamindar had to take a canal from the river to water his holding, he would take, in the first case, the best land that could be easily irrigated, but might, in order to reach that best land go through a good deal of perhaps indifferent land. In exceptional years, he would be able to cultivate that indifferent land. Obviously if another zamindar were allowed to settle between his holdings, he might be expected to give a good deal of trouble and stop a good deal of the water, and therefore it was recognised that this land should not be given to any one else if the original zamindar had any objection to it.

58951. This is a system which it would be difficult to fit into the conditions of perennial irrigation; is it not?—I do not think there is any question of fitting it in; the real question is the extent to which one is going to recognise these claims. I believe, in the Punjab when they have perennial irrigation, if a particular piece of land is in a zamindar's *mohag*, that is regarded as an excellent reason why he should be able to pay a bigger price than anybody else. We shall undoubtedly approach that condition of things in Sind, but for various reasons it is necesary to recognise these claims to some extent. As I have already said, the vacant land which we have is very fragmented; and it is not a practicable proposition to get an outside zamindar to go in for a *little* piece of land in the middle of the holdings of another zamindar; and even where it is practicable one cannot expect to get a reasonable price. So, it is advisable from more than one point of view to give it to the local zamindar at a fairly low rate.

58952. Do you propose to create in the Barrage area any rights of *mohag* where none now exist?—Certainly not.

58953. Are you satisfied with the provision made in the Barrage area for drainage?—That is a matter in which I am not a technical expert, and I am bound to accept the opinion of engineers. But so far as I am able to understand, I think the provision is adequate, and some think it excessive. Our drainage problem is certainly different from that of the Punjab.

58954. You mention on page 36, in answer to Question No. 3 (*b*) (2), your views about the demonstrations carried on in the cultivators' own holdings. Have you had any experience of such demonstrations?—No; I have had no experience. I am of course very well acquainted with the criticisms made by the ordinary cultivators of the existing system.

58955. It appears to be your view that the Agricultural Department is hardly getting down to the cultivator?—Yes; I think so. That is certainly the case in Sind.

58956. Is that due to the insufficiency of the numbers or the quality of the staff?—I think it is probably due to both in Sind.

58957. With reference to the Sakrand station for research, do you agree with the proposal according to which, apparently, responsibility for the work is to be held by a gentleman who will be resident in Poona?—No; I certainly do not. I think that it does certainly require a man, a man of considerable calibre, to be in Sind the whole time, and the importance of the work is sufficient to justify that. I think it is quite wrong to try to run a thing like that from Poona, however capable the man is. It is not merely a matter of capacity; one cannot deal with the thing on paper; a great deal of the officer's work will consist not only in giving advice, but actually seeing and satisfying himself that his advice is carried out.

58958. Who is to be the agent of the Director of Agriculture on the spot here?—I am afraid I am not altogether familiar with what is now proposed, whether it is proposed that the Deputy Director of Agriculture in Sind should in any way be responsible for the work of the sub-station at Sakrand, or whether the work at Sakrand is proposed to be carried out under the immediate and direct supervision of the Director of Agriculture in Poona. I do not know what is proposed.

58959. Have you formed any view as to whether the one station at Sakrand is sufficient?—I think it is probably sufficient for general purposes, but we do require more demonstration stations in other parts. For the particular purpose for which it was formed, I think, it is probably sufficient; it is not so much a demonstration station as a research station.

58960. Is any study being made at Sakrand, of the problem of soil deterioration as a consequence of irrigation?—I understand that they are studying it; but of course the thing is in its infancy yet; it was only started a little over a year ago. When I saw it last (I saw it in January) the work was not very far advanced.

58961. Do you regard it as important that this work in connection with research on irrigation should be taken seriously and undertaken at as early a date as possible?—I think it is of very great importance, and that it should be taken very seriously, and the results made available to the public as widely as possible.

58962. It is very little use waiting until the damage is half done?—Of course, in certain respects the experiment is already somewhat belated. They are studying the question of the "duties" for various crops, and here we are already constructing our scheme and providing for certain "duties" for the land. It is really work which ought to have been done ten years ago.

58963. So far as that affects the size of the canals?—Yes. It is very little use having a station and getting results to show that the present duties are wholly inadequate, by the time you have already constructed your Barrage and made your canals.

58964. On page 36, you deal with the taluka development associations. Have you any personal experience of taluka development associations?—Only from meeting occasionally members of these associations, on tour, and making general enquiries about them. They are only two or three years old. They were not in existence when I was in Sind before, and they are one of the new features that I come back to find. Where they can get good men, who are really interested in agriculture and have a certain amount of drive, they are capable of doing good work.

58965. Do you think there is any danger that such associations will fall into indifferent hands?—There is always the danger, when officials try to help forward any movement in this country, that certain people who have not the movement at heart will come into it, solely with the view of pleasing the officials, prominent men in talukas, who have their finger in every pie, whether they know anything about it or not, and whether they have any real interest in it or not.

58966. On page 36, you are giving a list of the successes and failures. Is it not the case that a good deal has been done to introduce some of the Pusa wheats in Sind?—I believe that is so, but my answer refers to things of which I had personal experience. Those Pusa wheats, for the most part, were introduced into Upper Sind, in places where I had not served.

58967. How about winter ploughing? Have you witnessed the introduction of that particular method?—No, I have not.

58968. On page 37, you are dealing with the construction of feeder railways. You say "More feeder railways will be urgently necessary in Sind for the development of the Lloyd Barrage area. These are now under consideration." What is the gauge proposed?—Ordinary broad gauge for the most part.

58969. Are they likely to be constructed at an early date?—I hope so. I believe the Railway Board were prepared to start the construction during the coming cold weather on the left bank. There was a question of a guarantee from Government. That was sent to me for opinion. I strongly recommended that it should be accepted. I do not know what the decision of Government on the matter has been. My opinion is that they ought to be pushed on as rapidly as possible.

58970. You are dealing with the matter of roads. Have you a Road Board in Sind?—It is just appointed; it has not yet met. I am a member of the board.

58971. Is a calculated attempt being made to lay out these roads with due regard to the proposed feeder railways?—That will have to be done, and also of course with the canals. The Public Works Department have just appointed a special officer to make a preliminary survey, and it means very complicated negotiations with local boards and so on, who have to be brought into the scheme.

58972. But that attempt at co-ordination has not yet been made?—It has not yet been made. The necessity of it is realised.

58973. On page 37, in answer to Questions 6 (*b*) and (*c*), you suggest that legislation on the lines of the Punjab Alienation Act would have a salutary effect in restricting the credit of the more extravagant?—Yes, but it should not be interpreted that we necessarily recommend legislation on the lines of the Punjab Alienation Act. Such legislation would also have very important political reverberations which have to be considered. I do not wish my answer to be interpreted as my having plumped for legislation on the lines of the Punjab Alienation Act.

58974. Page 37, Question 7 (*a*): How exactly is the carrying on of a rectangular survey going to affect fragmentation of holdings? I do not quite see the connection?—The reason is this, that the rectangular survey is being done, in the first instance, in vacant lands, and then it has to be done, very largely by persuasion, in lands which are already occupied. There will very often be a village containing, say, 2,000 acres, at present divided up into survey numbers of all shapes and sizes. Out of the 2,000 acres, perhaps there will be 1,600 acres which is occupied land, held in holdings of various sizes, some large and some small, and the remaining 400 acres may be

Government land, also in scattered little pieces. I have just deputed two officers to the Punjab to study their methods there. I hope that it will be possible to get the people in such a village to form a co-operative society for gathering their holdings together, and work into the survey square the whole land of the village. I should stipulate that instead of 400 acres of vacant land scattered about, I would get 300 acres given to me, but all in one holding. 300 acres all in one holding is more valuable to me than 400 acres in scattered pieces. That gives the landholders 100 acres which they can play about with, and with that inducement I hope they would consent to have their lands squared and would possibly amicably arrange to gather their holdings together.

58975. Is the Revenue Department doing this work?—It is not being done at all yet. It is an idea of my own which struck me after visiting the Punjab and touring about there and learning about the work of their consolidation societies. The two officers I sent to the Punjab have just returned, but they have not submitted their report yet.

58976. Which department would you suggest for this work?—The Revenue Department. It would probably have to be done under my own supervision, but I am not at present prepared to say that the work would be successful. I think it offers some promise.

58977. Do you think it is the unstable conditions of water supply that have checked the spread of American cotton?—I think probably that is the main reason. American cotton wants its water fairly early, and if the river is late in rising, the people are afraid to sow American cotton.

58978. Do you think the indifferent marketing conditions and the failure on the part of the cultivator to get a fair share of the higher value of such cotton may have its bearing on his disinclination to sow it?—It certainly had a bearing on it in the earlier years. I was better acquainted with these experiments ten years ago, when I was Assistant Collector in Mirpurkhas division, where practically all this American cotton was grown, and then it certainly was an important factor. Whether it has been so in the last two or three years I am not able to say.

58979. Have you got much land under F. 4 Punjab?—I could not say the quantity. I am afraid I have not got the figures.

58980. It seems to be your view that it will be possible to provide the increased population required as a consequence of the Lloyd Barrage being constructed, without any important volume of immigration from outside the Province?—Yes. I think the difficulties of the population question are generally somewhat exaggerated. At present, in the whole of Sind, we have about one acre of cultivation per head of population. Now, a more developed area such as the Jamrao has a limited amount of water available in the *rabi* season, and in the Jamrao you have an acreage of more than one-and-a-half acres per head of population, even under existing conditions. The population of the Sukkur Barrage tract is already well over two millions, and we only expect to work up to our full cultivation in thirty years, with, say, an increase of something like forty per cent. in the first fifteen years, and I do not think that is at all out of the way, when you consider what has happened in the Punjab. Take the Lyallpur colony. I believe the population in what is now the Lyallpur district was about 40,000 in the census of 1881; it had gone down to about 30,000 in 1891, and the population of the tract now is over a million.

58981. You do not suggest that there will not be a certain amount of migration into the Province?—I think there will be migration into the Province.

58982. On page 39, in answer to Question 22 (*b*) (*v*), you say: "Two officers have just been deputed to make a careful study in the light of Sind conditions of the work being done in the Punjab." Who are those officers?—One is Khan Bahadur Azimkhan, the Assistant Registrar of Co-operative Societies, whom you are going to examine to-morrow or the next day, and the other is Mr. Bulchand, my survey officer. He is very well acquainted with all matters affecting survey and size of holdings.

58983. Has co-operation made much progress in Sind, since you have known it?—A great deal.

58984. Do you think it is promising well?—I think so. I have myself not been in very close touch with it. I have referred to one society which I did know, which was not a very good one. I should say that was almost the first society in Sind; it is probably one of the first half dozen. I was in touch with it ten years ago.

58985. Have you seen co-operative work carried on by credit societies?—I have seen very little of the working of these societies first hand.

58986. Have you any definite system of collecting crop statistics in Sind? Is there available accurate information?—There is plenty of system, possibly not so much accuracy. We have very elaborate taluka forms, which have to be kept by the village accountant. He is a man who is not very well paid, and has a great deal to do, and I have very little doubt that some of the forms which he regards as unimportant he probably fills up at the end of the year by sitting in his office and putting down what he thinks to be reasonable figures. But many of the forms have to be kept accurately. The most important, those that deal with acreage and land revenue, are probably more accurate than such figures are elsewhere, because revenue depends on the amount of cultivation. Every field has to be inspected every year for getting that essential information. But when you come to things like census of cattle, and the number of animals killed by wolves and so on, I think the *tapedar* probably sits in his office at the end of the year, says "I think four is a good round number" and puts down four.

58987. *Dr. Hyder:* Are the figures of yield of crops accurate?—The figures of yield are not very reliable.

58988. *The Chairman:* Are tests carried out?—Tests are carried out by the various Sub-divisional Officers from time to time, but I am not aware that the Director of Agriculture ever accepts those figures as a basis for altering his figures of average yield. There is very little co-ordination in the matter.

58989. How about the attitude of the population towards the Lloyd Barrage? Do they welcome the development?—Very much indeed. I think perhaps the best illustration of that which I can give you is the popular name which the department has earned for itself.

58990. Which department?—The Barrage Department. It is known as the "Sind Sudhar," the department for the improvement of Sind.

58991. How about the application of scientific agriculture to the district? Is that a popular idea?—I do not think that this is a matter which has soaked down to them yet. I think the probable way in which that will be brought home to them is when they find that they have to pay considerably higher rates of revenue.

58992. They will have to get the best out of the land?—There will certainly be a greater inducement to them than there is at present. They are very conservative, and a very large number of people are not in the least interested if you tell them that they can double the yield of their fields. They say "We have enough; why worry? Why get more?" For example, on the Jamrao, I have frequently ridden down a ten foot road, separating cotton grown by some of the best Punjabi immigrants, peasant colonists, on one side of the road, from a most awfully tangled cotton crop on the other side of the road. The conditions of irrigation are exactly the same, the water is from the same source; the difference is in the quality of the cultivator. I would say to the Punjabi "How much seed do you put in your field?" He would say "Five *seers*." I would turn to the Sindhi zamindar and ask him "How much do you put in," and he would say "Thirty *seers*." I would suggest to him that he might, by way of experiment, try to put in five *seers* like the Punjabi, and I would get the reply "He is a Punjabi, I am a Sindhi." I have had that reply given to me over and over again. It is considered a conclusive argument. I am speaking of ten years ago, and I do believe that attitude is breaking down to some extent, but the way

in which those people live side by side and deliberately learn nothing from each other is astonishing. It is not only the Sindhi; the Punjabi in other ways is just as conservative. The Punjabi would frequently come to me and want a ten foot road constructed, usually through somebody else's land, in order that he might remove his produce by bullock cart. The country would be full of camels, and everybody would take his produce by camels. You suggest to the Punjabi that he might make use of camels for transport, and his reply is "I am a Punjabi." That is the attitude of mind which one has to wrestle with.

58993. *The Raja of Parlakimedi:* In the Province of Sind, are the rights of zamindars over irrigation sources well defined?—Yes, I think so, so far as I understand your question.

58994. Suppose a river runs through a zamindari, are the rights over the river bed and the water fully defined?—They are well enough defined, and I think the present custom is rather an unjust one; at any rate, it is very unequal in its working. The river changes its bed and goes clean through a man's land, and wipes out his whole holding. He loses his holding, and the land which is exposed owing to the change of the river is not given to him in exchange. It adheres to the holding of the man on the other side, to whose land it is an accretion; it belongs to him. Subsequently, the river may go back, but the man who had lost his holding does not get the land back; it adheres to the land of the man who has a holding on the other side.

58995. Under such circumstances, how is he compensated?—He is not compensated.

58996. Has he still to pay the same revenue?—He pays nothing. In Sind no one pays revenue on land unless it is cultivated; you cannot cultivate it when it is at the bottom of the river.

58997. Suppose the Government settled a certain rate for irrigation, under the river, and the man is not benefited by it, does the Government write off that charge?—He never pays any kind of rate. We have a consolidated rate for land revenue and irrigation, which is not paid at all where the land is not cultivated. The zamindar who does not cultivate the land pays absolutely nothing in any way for it; so that the zamindar losing his land pays nothing. When I say he is not compensated, I do not mean to say that extraordinary cases like that would not be regarded with a great deal of sympathy by Government, and Government, if it were possible to do so, would give him land elsewhere, rather than that he should be ruined altogether, but he has no kind of legal claim.

58998. Suppose the zamindar wishes to effect any improvement for irrigating more area of his estate, is it left to him to settle his rate of revenue with the cultivators, and come to an understanding with the cultivator instead of going to a court to have it confirmed; is such an undertaking binding on either parties?—The zamindar in Sind gives out his land to a cultivator, and the cultivator gets a share of the produce. So that, any improvement which the zamindar introduces which increases the outturn, is naturally shared between him and the cultivator.

58999. The zamindar cannot expect to increase his share of the revenue from the holding, after introducing that improvement?—His share of the revenue is entirely a matter of arrangement between him and the cultivator. There are very strong customs. For example, generally speaking, for flow land, the zamindar takes half of the crop, and the *hari*, the cultivator takes the other half. In the case of lift land, the usual arrangement is that the zamindar takes one-third and the cultivator two-thirds. But there is no reason why, if the zamindar and the cultivator are able to agree on another rate, they should not do so. The cultivator has no rights in the soil. If he is not willing to accept the zamindar's terms, the zamindar can turn him out and get some one else.

59000. The cultivator has no rights upon the holding?—No. If the zamindar wants to get cultivators, of course he must pay certain attention to established

custom; otherwise, he would not be able to get the cultivators. But provided the cultivators are willing to come to him, there is no reason why he should not impose any terms. If he can get a cultivator to accept less, say one-tenth instead of one-half, there is nothing to prevent him doing so.

59001. There is nothing in the Act?—Nothing at all.

59002. For instance, in other parts of India, the ryots come to a zamindar with a promise that they will pay enhanced rates of rent, if an improvement is effected, and the zamindar carries it out on a sort of moral understanding, and after that, because the Act says that such an agreement is invalid unless it is confirmed by a court, there is every chance of the ryot going back upon his promise. I suppose there is nothing of that sort here?—I suppose, if an agreement of that kind is reduced to writing, it is a matter of legal interpretation for the courts, but the Irrigation Department, for example, has nothing to do with it.

59003. As regards agricultural bias education, which you wish to be spread in the country, how would you distribute the number of schools?—My idea was that all schools in rural areas should be given a sort of agricultural bias, rather than that there should be a few agricultural bias schools here and there. I think probably one could make their school readers more practical, one could instruct the boys in simple biology, and let them know what was going on in the fields around them, enlightened object lessons, and so on. I do not intend to imply any further addition to the curriculum. I mean that it must always be present to the mind of the schoolmaster that a great number of the boys he teaches are going to be cultivators and he should try to train them for the life they are going to lead.

59004. Have you observed which part of the population takes to education?—Generally speaking, of course Hindus more than Mussalmans. The Mussalman is fully alive to the value of education, but generally speaking he is rather poorer and his boys are wanted for work in the fields rather more than the boys of shopkeepers who always let their boys go to school during certain hours of the day and use them in the shop when they are free.

59005. I mean the cultivating class; are they fairly well represented in the schools? Do they take to education?—That is very largely a matter of local need, the zamindar of the village and so on. But the main thing which prevents it is, I think, the economic factor, that boys are more useful and do a great deal of useful work in cultivation at a very early age and particularly during certain periods, such as the various reaping times of the year. If you are going to interrupt the boy's schooling every now and then, for two to three months, he might almost as well stay away altogether.

59006. Would you conduct these agricultural bias schools as night schools?—Certainly not. I do not see any reason why the boys should be sent to the night schools. It is a horrible idea to send children to work in the fields during the day and to learn at school during the night.

59007. Would you be able to attract a greater number of pupils from the cultivating class if you conducted the teaching in the vernacular?—They are taught in the vernacular; they must be taught in the vernacular. I am thinking of boys under the age of fourteen; I am not thinking of adult classes at all.

59008. *Sir James MacKenna:* Are you familiar with the experiment in Mirpurkhas with Egyptian cotton?—No; it was conducted before I went there. I think it was written down as a failure, mainly because of defective marketing. I am not quite sure, but I think the seed deteriorated in Sind. It had been definitely set aside by the Agricultural Department as a failure. But the experiment was conducted before I went to Mirpurkhas; I was in Mirpurkhas from 1913-16.

59009. Was it in the time of Mr. Henderson?—Yes.

59010. What about this Sakrand farm and the agricultural operations there? Have you seen it?—I was there towards the end of January or February.

59011. Can you give us any idea of the agricultural experiments carried out there? Is it primarily experiments for irrigation, for example, water distribution, etcetera? Was there any indication of what they were trying to do?—There was very little indication to me, but the idea was to conduct experiments under Barrage conditions. I understood that they were going to experiment on *kallar*.

59012. Do you not think that they should devote attention to the varieties of cotton, wheat, and rice that can be grown in the Barrage area; in other words, that as much emphasis should be given to the agricultural side as to the soil problem?—I am rather of the opinion that we have already reached the stage when we know that certain varieties of wheat, cotton and rice are much better than others which are generally grown, and in my opinion, we should do better now by concentrating on the best we have and getting them fairly well established. Once you have got rid of the inferior varieties and established the good ones in their place, then all your propaganda work is bound to succeed and everybody will be willing to introduce still better varieties. We have already got to the stage when what is wanted is propaganda for extending the best of what we have.

59013. *Professor Gangulee:* You attach a great deal of importance to the research work at Sakrand station; do you consider that Government have adequately supported the research scheme financially?—I do not think the thing has been held up for lack of money in any way. No complaint of that kind has been made to me.

59014. I understand that at the present time the sum of four lakhs is the recurring expenditure; is that adequate for the work?—I think if it were not found adequate and a reasoned statement of the case was put up, then Government would have every sympathy and every interest in giving what was necessary.

59015. The station has been at work two or three years?—Actually at work rather under two years.

59016. We are told that the Lloyd Barrage water will be available by 1931. Do you think the station will then be in a position to give definite advice to the cultivator on the cultivation of land within the Barrage tract?—I think they are already in a position to give a great deal of advice with regard to the crops to the cultivator. Even the worst equipped member of the Agricultural Department is a great deal ahead of the average cultivator.

59017. I know that is so; but I mean with regard to certain special problems arising out of perennial irrigation; say definite instructions with regard to crops, use of water, preventive measures with regard to the rise of alkali, etcetera?—At present they are in a position to give a great deal of useful advice.

59018. I was not referring to the ordinary information which demonstrators have at their disposal. I was really referring to definite results of the experiments at Sakrand?—When you talk of these experiments, it must be obvious that until the experiments are over you are not in a position to give definite advice.

59019. You are not in touch with the nature of the experiments there?—I am not of course in close touch with them.

59020. The results obtained from Sakrand will not be applicable to the right bank area; would you require another station for that tract?—I think, except on the Central Rice Canal, they would apply to the right bank. The soil of Sind is on the whole fairly homogeneous. When I say that, I do not mean that there is not a tremendous amount of variation in limited areas; but generally speaking there is no marked difference between the kind of soil you have on the right bank and what you have on the left bank. It is largely a question of levels. The Central Rice Canal has of course its own problems.

59021. The *hari* is your actual cultivator?—Yes.

59022. Under the present system of farming he has no permanent interest in the land?—None at all, except in a few places where he is definitely

attached to the soil (but this is special to certain places); but generally speaking the *hari* has no interest in any particular land.

59023. Do you think such a state of affairs offers any inducement to agricultural improvement?—I think there might be more inducement offered than now. But there is this point, the relation between the *hari* and the zamindar is always on the basis of *batai* (sharing of the actual crop) so that any encouragement given by the zamindar which results in increasing the crop increases both his own share and the *hari's* share. Therefore, you would expect that there would be a certain community of interest between both to get the best out of the land.

59024. You have referred to *mohag* rights; is it not a fact that a great deal of land will remain unsold by virtue of this *mohag* right?—It is not sold at full rates; a great deal of land will be given to zamindars in satisfaction of all rights, mohag, frontage, and fallow forfeited land. Fallow forfeited land is land forfeited under the fallow rules and is naturally included in the zamindar's existing *mohag*. Generally speaking, the zamindar's fallow forfeited land is the land which he was not able to cultivate; it is land which is with difficulty reached by water; it is generally situated in the extremity of his holding. Naturally, the right for the land which was once in his possession is somewhat stronger than the ordinary claim of *mohag* over other land. To meet all these claims based on frontage, including fallow forfeited land and so on, Government have proposed to set aside some three-and-a-half lakhs of acres; that represents about roughly 25 per cent of the total Government land available.

5925. Referring to taluka development associations you suggest that funds would be required to facilitate their work. Have you any suggestion to make as to how funds could be raised; or do you suggest that subsidies should come from Government?—I am afraid I cannot suggest anything except grants from Government or from local boards. I think it will take a long time to persuade local boards to make grants to taluka development associations.

59026. But if they realise that good work is done do you not think that local boards can be persuaded to support these institutions?—I should like to think so; but I have some experience of trying to persuade the local boards to do things, and they rather look to Government for funds.

59027. You have explained to us what you really mean by the reference to the Punjab Alienation Act. Do you find any tendency in Sind of land passing into the hands of non-agriculturists?—Yes; there is a certain tendency. It is very difficult to get accurate figures. The Bombay Government have placed an officer on special duty and I understand he has collected these figures. The report is not yet available, and I have not seen it. But there is a great deal of complaint about it in certain local areas, and I do know of certain instances in which comparatively poor Hindu shop-keepers have within a short time erected themselves into the position of very large zamindars. I have no doubt that personal capacity had a great deal to do with it; but there is a great deal of feeling about the matter.

59028. You say that insufficient attention has been paid to the problem of lift irrigation, irrigation by means of pumping. What do you definitely suggest to the Government of Bombay?—I think that they should support such schemes. I believe there is a great deal of information available elsewhere as to the cost of lifting water in large volume; we have very little experience of it here; and my impression is that the question has not been seriously tackled either by the Engineering Department or by the Agricultural Department. There is no obvious reason why, if it is possible in the Punjab to raise water by pumps, the same thing should not be done in Sind.

59029. In answer to Question 22 (*c*), you say you are in favour of legislation to compel a recalcitrant minority to join any co-operative scheme. Would you apply this argument in other spheres of social or economic legislation?—I am not prepared to put that forward as a general proposition; I should like to know what the particular scheme was. I am certainly not definitely against interference in such cases, because, as I have said, the difference in outlook between people even in the smallest villages is enormous (more than what you get in Europe); you never get everybody to agree.

59030. You refer to a scheme of education and you suggest that some sort of agricultural bias should be given to education. You suggest that an elementary course of biology should be taught. You want to proceed one step further than the previous witness who wanted only diffusion of literacy. Would you increase the dose of education a little more than he was prepared to prescribe?—I would rather give a different drug. It is not a question of increasing the dose; but it is a question of giving a different medicine. I would like to see the village people taught about the things going on all around them.

59031. In addition to the ordinary three R's?—Yes; I am not suggesting this as a substitute for reading, writing and arithmetic.

59032. You would not confine yourself to the three R's?—Certainly I would not.

59033. *Mr. Kamat:* About the sale of lands and colonisation, I gather that you said that no definite proposals have yet been framed by Government. When these proposals come to be formulated, would you consider it desirable that they should be published for public criticism?—I cannot say that I ever considered that, but I really do not see any objection to it. In any case the land which we have to give out will be given out over a period of twenty years at least, and there is no reason why mistakes that are made in the beginning should not be rectified as we go along. Nobody is proposing to give out the one-and-a-half million acres of land all at once; it cannot be done; it must be absorbed gradually; and undoubtedly we shall get a great deal of advice and criticism from the public, which we shall value. At present, when these schemes have not yet been formulated, I should value such criticism; but what usually happens is that people ask me what my scheme is; they find it very much easier, as we all do, to get a scheme and to criticise it than to start from the beginning and make suggestions of their own and I am able to reply at present: "Well I have no scheme, but let me have your ideas." That closes correspondence.

59034. Although the land will not be sold all at once, yet once Government formulate their rules, and decide to bring them into force, it is rather too late for the public to get them amended?—I do not think that is so. Obviously if you gave out land on certain conditions, you could not amend those conditions with respect to that land already given out but there is no reason, if you find the conditions working badly, why you should not amend the conditions with reference to the land you are going to give out for the next few years.

59035. You know that it is generally difficult to get a policy changed in any way?—I agree that that is sometimes the case, but there is as much difficulty caused by policies being changed a great deal too often as by their not being changed often enough. It is sometimes difficult to get Government to stick to a policy for more than ten minutes.

59036. Is the percentage of Punjabi cultivators in Sind large or small?—Reckoned in percentage I think it is very small; but there is undoubtedly, I think, a growing influx of Punjabis into Sind. We have colonies of them, on the Jamrao, which was largely colonised from the Punjab; whole villages are colonised by them. Land was given to *abadgars*, and those people have made money out of Sind. They know what the Sind lands are like, some of them are now zamindars and are going about Sind and buying land elsewhere. They have also certainly got connections with the Punjab, and owing to their propaganda other Punjabis have bought land here and there all over Sind. Naturally this tendency is growing, because the Punjabi realises more clearly than the Sindhi the immense value of land under perennial irrigation; the Punjabi is familiar with canals, the Sindhi has never really seen a first class canal and he is still rather sceptical about the high profits which we tell him he can get from these lands.

59037. If you sell these lands for colonisation by auction, which you said you proposed to do, ... ?—I said I would propose to sell some by auction.

59038. Do you not apprehend that there would be a great Punjabi invasion, because the Punjabi has so to say tasted blood so far as colonisation schemes are concerned?—I certainly do not see why we should exclude the Punjabis

from Sind, if that is what you suggest. We want the superior knowledge and energy of the Punjabi merely as an example to our own people; they are very slow to learn by example, but they will be slower still if they have no example at all.

59039. You have visited the Punjab; did you notice that at the Lyallpur Agricultural College they do not keep an open door to the Sindhi students?—I do not remember that being brought to my notice; I rather went to see the actual things they were doing than to represent the interests of Sind in any respect.

59040. For the capital involved in the Barrage scheme, has the Punjabi contributed a large share?—The capital has been borrowed from the Government of India. It may be said that the Punjabi has contributed as much as the Sindhi. The people of Sind as such have made no direct contribution to the cost. We are at present working merely on borrowed capital.

59041. What I want to ascertain is, amongst the investors, so far as it can be ascertained, are the Punjabis preponderant?—Amongst the investors in the Government of India loans, it is probable that the Punjabi, being comparatively more affluent, has put in more money than the Sindhi on an average.

59042. Speaking about the feeder railways to which you have made reference, what are the actual projects under construction?—On the left bank there are three short lines proposed to go, as far as I remember, from Tando Adam, a station which is north of Hyderabad, going between the river and the existing line up as far as, I think, Mehrabpur. Generally speaking they will serve a fairly wide belt of country between the Indus and the existing line from a little north of Hyderabad to a little south of Sukkur.

59043. Do they involve a guarantee of interest on the part of Government?—I think the last time I dealt with the project officially the position was that the Government of India had asked us to give a guarantee of at least four lakhs for the first five years, and, I think, two lakhs for the next five years, I am not absolutely certain of the figures, but it was four lakhs for the first five years.

59044. So that Government are pursuing a policy of extension, even when they have to guarantee the interest, wherever it may be necessary?—I do not know what decision the Bombay Government have come to. I certainly recommended that we should.

Sir Chunilal Mehta: We have accepted it.

59045. *Mr. Kamat:* Coming to your remarks about the Punjab Land Alienation Act, do you recognise in this Province of Sind any such distinction between the agriculturists as hereditary agriculturists and non-hereditary agriculturists; that is to say, do you classify an agriculturist as such because his grandfather or great-grandfather was an agriculturist?—We have no such official classification. Generally speaking, it is probably true that agriculture goes down from father to son like almost any profession in this country; undoubtedly it will be easy to give exceptions. I do not follow the object of the question. Are you suggesting that we should have considerable difficulty in classifying agriculturists and non-agriculturists?

59046. In the Punjab they make such classification. I wanted to know whether you are in favour of such artificial classification?—I am afraid I do not follow what the question is, and in view of its importance I would rather have the question quite clear before I give an answer.

59047. In the Punjab they do classify (I do not know on what basis) some people as agricultural tribes and others as non-agricultural tribes. Now, if you are in favour of the application of the Punjab Land Alienation Act to Sind (you say it has had a salutary effect), I want to know whether you would have the power to make the same classification in this province of Sind?—You would certainly have to have some classification; but I do not see why you should have the same classification as they have in the Punjab. I am prepared to say that in our classification you might possibly have various Hindu castes classed as agriculturists, if they express a general desire. I have not discovered a large body of Hindu opinion favouring the application of any such legislation to them.

59048. I am not speaking of Hindu and non-Hindu. Supposing a particular man wanted to cultivate land, would you exclude him under the Act, because his grandfather was not an agriculturist?—If you can get a classification which would include him, I should not object. The real point is that, generally speaking, such a man would not want to be included.

59049. The real point is not that. Whether a man is Hindu or Mussalman, agriculturist by heredity or not, if he wishes to buy land and develop it, would you prevent land being alienated to him?—I should not refuse to include him among those to whom land can be alienated. I do not think anybody has ever suggested that people who are not agriculturists should be definitely excluded from purchase of land. For sales of land under the Barrage I should certainly not wish to exclude them.

59050. As regards the total acreage which will be commanded by the Barrage when it comes under full operation, you said that a large portion of the land might not be saleable immediately; that is to say, there would be no demand for it at once?—It is saleable tomorrow at a price; but you could not expect to put one-and-a-half million acres of land into the market at once and get a reasonable price for it. If I were willing to sell it for two or three rupees per acre, I should have no difficulty in getting a zamindar to buy up the whole land immediately.

59051. That is not what I meant. You have referred to the interest charges which are accumulating, and you have said that to save those interest charges you may clear off a certain portion of land?—What I mean is this: if we sell land in advance and get a reasonable price, we can keep down the total capital charges on the project to a much smaller figure. Obviously, the longer you allow the thing to go on before you begin to get in any income, the larger your total capital charge becomes.

59052. Taking that into consideration, which would be the better policy, a waiting policy or the policy of quicker sale?—On the whole, I should think the waiting policy would be better, because this is not the only question involved. If you give out land too rapidly and at a low price, it gets into the hands of people who have no capital and no ability to develop it. This scheme is going to bring in money not merely by capital receipts; that is important, but that is not really so important as the revenue we will get. I am for getting steady revenue, rather than getting a large amount of money at once by sales of land and then indefinitely holding up the development of the land. If you gave all the land under the Barrage scheme at once to the Sind zamindar, you would have very little additional cultivation done when the water was available and things would go on just as usual, except that the zamindars would probably want to extend rice cultivation.

59053. From your observation of joint farming societies in the Punjab, do you think that co-operative societies for joint farming are not very encouraging?—I should like to explain: I did not see any of these societies in the Punjab. I had a talk with the Registrar, Mr. Strickland, at the time and by his courtesy I was enabled to go through the files relating to, I think, three out of five societies. There were only five societies. It was a very dismal record, and it was generally recognised in the Punjab that these land-holding societies were a failure. I think the difficulties in Sind would be still greater, and I think there is no hope of starting such societies at present with any chance of success.

59054. *Mr. Jamshed Mehta:* Can you give the Commission a list of the areas of virgin land which belongs to Government in the Lloyd Barrage area, the area which is cultivated belonging to Government, and also the area of the virgin land which belongs to private landholders?—I can give you rough figures. Do you mean for the whole area or for particular districts?

59055. Could you give the figures for the whole area? I am not particular about districts?—Roughly, the amount of Government land available is about one-and-a-half million acres in the whole area, belonging to Government. That is practically all virgin land, except a small area which has been given out for *eksali* cultivation to various zamindars; it is about a little over a lakh of acres.

59056. What is the area of the land, including that belonging to private holders now, which has got the advantage from the Lloyd Barrage?—Speaking from memory and very roughly, about eight million acres, I understand, is the total under command in the Barrage area.

59057. What will be the total cost of the scheme?—The rough cost is eighteen crores of rupees, and I think Mr. Harrison spoke of six million acres as being the amount likely to be actually cultivated in any particular year. Personally, I do not see why he takes that figure to work out the cost, rather than the total of eight million acres under command. If you take six million acres as the whole area commanded and eighteen crores as the cost, you get thirty rupees an acre.

59058. You just now told us that Government would encourage small holders. Is that your opinion about it?—I hope so. I am certainly very strongly in favour of developing small holdings as much as possible.

59059. How would you practise it? Supposing I am a small holder, how will I get the advantage of getting land? They would auction it and any rich capitalist would come in and buy it?—I do not think that follows at all. I paid a visit to Bikaner last year, and Bikaner had then sold about three-fifths of the land that was being commanded by the scheme. They had sold this land either at fixed prices, or in auctions, and eighty per cent of the sales had been made to peasant holders, who bought at full rates, and on exactly the same footing as other zamindars. On the day that I was at Bikaner, actually one of the cultivators from the Jamrao in Sind came up there to buy land at full rates. The man, in my opinion, who is unwilling to pay good rates for his land in Sind is not the small holder; it is the big holder. The big zamindar is all out for cheap land, and I think that Government will have no difficulty in getting a fair price out of the small holder. Of course, he must be given the benefit of instalments, very liberal instalments, and he will pay the instalments with his revenue from the produce of his land.

59060. Would you prefer Government to take interest only on the capital, at the market rate of interest or at the rate at which Government raised the loan, instead of taking the capital from the buyer? Would you advocate that to the Government?—I am afraid I do not follow.

59061. Supposing there are 40 acres of land, and the price is Rs. 100 an acre, the total cost will come to Rs. 4,000. Would you recommend to the Government that instead of taking Rs. 4,000 in cash from the buyer of the land, they should only take interest at five per cent?—In other words, you say that we should lend him the money to buy his land, and never get it back, but merely get interest on it.

59062. Yes. Would you recommend such a course?—I do not think there is any reason for it. I do not think Government could afford to do it.

59063. *Mr. Calvert:* Take *malkano* only?—*Malkano* in Sind has a different meaning from what you are accustomed to in the Punjab. *Malkano* in Sind is used to denote the whole of the purchase price. If that is not understood, we shall be at cross purposes. *Malkano* in the Punjab is an annual payment made by a tenant who has not acquired proprietory rights.

59064. *Mr. Jamshed Mehta:* He would go on paying interest. Government will not lose, because they will get the interest?—I have not studied that in detail, but having had it put forward to me now, I do not think there is any sufficient justification for such terms. I think the cultivator would be willing to pay more.

59065. You just now said something about leasing for twenty years. Do you recommend to the Government to allow a buyer only twenty years to purchase the land? In one of the answers to one of my colleagues, I think you said that?—What I said was, I think, that I expected the sales would be spread over twenty years. I did not mean to say that I would allow the man twenty years to pay for his land.

You said leases of twenty years. What did you mean by that?

59066. *Mr. Calvert:* You mentioned the case of land not quite ready?—I do not know whether I said twenty years. I think probably ten years will be the ordinary maximum, and in some cases only two or three years. That

depends on the state of the land and on various local considerations. In places there are large areas of extraordinarily good land covered with thick jungle. That is the kind of land which might be leased to a zamindar for three or four years, on condition that he clears it. He would get light lease terms during that period.

59067. *Mr. Jamshed Mehta:* You made a statement that because the relationship between the *hari* and the zamindar is one of partnership, it is to the interest of the zamindar to encourage the *hari*. What is your practical experience in Sind? Do you think the zamindar does encourage the *hari*?—I am afraid my practical experience is rather different. There are of course a few enlightened zamindars, but generally speaking the zamindar is inclined to leave it all to the *hari*. He does not take a great deal of interest in inducing the *hari* to adopt improved methods, and he is not himself sufficiently educated to give him advice that is any good. The *hari* often knows more about it than the zamindar.

59068. Would you not, from that point of view, in the interest of the *haris*, recommend to the Government to put forward some system by which we can help the *haris* to become proprietors of the land and become small holders in a period of years?—Are you suggesting that legislation should be introduced which would enable the *hari* to become a sharer or a full owner of land which at present belongs to some one else?

59069. I am talking of the Government virgin land?—Then he would not be a *hari*. A *hari* is a man who cultivates the land for a zamindar.

59070. What I wanted to suggest was, free the *hari* from his bondage, and then make him a small holder, by some facilities which the Government should give him?—That practically means, am I prepared to take *haris* and establish them as small holders? Certainly. The intelligent *hari* is just the man. If the question is "would you take him and put him in as a small holder, and let him cultivate for his own benefit instead of for the benefit of the zamindar?" The answer is "yes." But one could not do that sort of thing on a large scale, without reference to a large number of local considerations. The zamindars, for example, complain of the lack of *haris*. They say that they are already considerably handicapped in recent years by the lack of *haris*. It would not be equitable to make a dead set at a zamindar and take away all his *haris* and settle them in a village. But there is scope for a considerable amount of personal selection.

59071. Supposing a progressive syndicate of big merchants, or cotton growers or some such people came forward to buy land, in order to evolve a progressive scheme, would you recommend to Government to sell the land to them?—I should want to examine the scheme before I recommended it. I would certainly be prepared to consider it. In the Sudan, at present, they have a very large scheme of that kind, with which you, Sir, are probably familiar. There the land is taken over by a company of this sort. The company pay something like thirty or forty per cent of the produce, to the actual cultivator and the rest is shared between Government and the shareholders of the company in a certain fixed proportion. That is a scheme not of peasant proprietorship but of peasant tenantship, and it is an interesting experiment. I should like to know more about it, or even to go there and see it if possible while on leave. I am certainly prepared to consider any scheme of that kind and to make recommendations to Government. I naturally cannot commit myself to anything further than an examination of it at present.

59072. Is it your experience in Sind that the agricultural class, the zamindars, even now object to the non-agriculturists coming into the Sukkur Barrage land? Have you heard that they object to it?—No. I do not think I could say that has been brought to my notice. I think that at any rate all classes in Sind will have to be left free to purchase lands in Sind.

59073. You make a statement on page 39 against joint farming, because it has failed in the Punjab. But supposing joint farming were taken up by educated young men who are not able to earn their living in other ways and have necessarily to go into agriculture, would you still feel that it would be unsuccessful?—I should think if such a land holding society were formed,

composed entirely of educated young men who had no practical experience of agriculture, it would be more likely to crash rapidly than any other kind of society that I can conceive of.

59074. Supposing you give them experts with agricultural knowledge, or agricultural students, if you give them such an opportunity, do you think it would be hopeless to expect that the educated man would go back to agriculture?—Not in the least. I think there has already been a considerable advance in the attitude of the educated young men towards other than purely clerical occupations. When I first came to Sind in 1910, I found very few of these young men would take up any kind of trade, but now you will find Karachi is absolutely full of shops run by these people. But they have not as yet turned to actual work on the land with their own hands. I do not think it is hopeless to think that they would, and if we can induce them to do so, I think it is a very fine ideal and a thing that we should encourage in every way. If we can get classes who are at present too numerous for their ordinary avocations and are averse to agriculture, if we can get such people to supplement the numbers of the agricultural classes, so much the better. What I am against is simply setting them up as a rent receiving class from the very beginning. Most of the suggestions hitherto made on their behalf, I believe, have been devoted to starting these young men off with fairly large holdings, anything from 80 to 250 acres, which is very much more than an economic holding under the Barrage. If they get holdings of that kind, they would certainly immediately go to some of the towns or big villages and proceed to give their land to *haris*, and live on the rent of the land. This is going to do no good at all, and it is absolutely of no use. If the educated young man who is at present without land, or capital, or knowledge, wants to take up land as a peasant proprietor, I should like to encourage him in every way, and I think he can show an earnest of his sincerity now by going to work as a *hari* with the zamindar. He can make a living by working as a *hari* with the zamindar. After all, men of the British middle classes are going out to the colonies without capital or knowledge, and they are gaining capital and knowledge by working simply as farm servants in the roughest sort of way. I see no reason why the Indian educated young man who is really keen on it should not do the same. If he will do that, I believe Government will do all they can to encourage him; start him off with a small holding of 16 acres or so, which is enough for a living, and if men like him made good, every encouragement would be given to them to take up further land, so that they could do very well indeed. But I do think that the initiative lies with these persons, and they can show their sincerity by getting training by actual work on a farm during the next three or four years.

59075. On page 39, you suggest that minorities should be compelled. Have you heard of any such legislation in India?—Of course, there is a lot of legislation which does compel minorities to do various things. In fact, in a way, most legislation is devoted to compelling minorities either to do or not to do certain things. A particular example is the Bill which has just been introduced in the Bombay Legislative Council relating to the consolidation of holdings. There are certain clauses of that bill which do propose to compel minorities to come in. In the Punjab, I believe, in the matter of consolidation of holdings they have had their work tremendously held up in some cases by recalcitrant minorities, sometimes very small. They get two or three people in the village who simply will not come in. In one instance there was merely one man who held out, and would not come into a scheme. But they decided to go on with consolidation in spite of him. They left out his land and consolidated everybody else's. Now of course that village is the greatest advertisement they have, because they can take people round and show, by way of example, the man who would not come in. He cannot now come in; he is left with little pieces of land all over the place; other people's holdings have been consolidated. The work in the Punjab has been handicapped by very small minorities of people, who will not come in willingly and cannot be compelled.

59076. On page 37, you say something about pumping schemes for low lying land. Do you think we can have co-operative societies formed specially

for that purpose?—If they can engage the necessary technical knowledge, I do not see why not.

59077. Do you know of Government making any scheme for roads in Sind? Everybody accepts the importance of roads in Sind but are you aware of any regular scheme being made?—No. The Communications Board has only just been formed, and of course the whole state of communications in Sind at present is necessarily in rather a state of flux, owing to the Barrage. We are having new canals; enormous bridges have to be made over these canals. We have a certain number of existing roads; some will have to be scrapped, some can be kept, and it is a thing which cannot be done in a hurry. There are, I understand, various schemes for improving the main trunk roads, and so on, in Sind, but naturally I am not very closely in touch with the details of those. I am not in a position to say at what stage they have arrived.

59078. On page 40, you refer to your experiences as Assistant to the Commissioner in Sind for Civil Supplies. Would you recommend to the Government to make their purchases for the Military Department through co-operative sale societies?—I am afraid I do not know enough about that to express any opinion whatever.

59079. You say that Government have reserved three-and-a-half lakhs of acres for *mohag* at present in the Sukkur Barrage area. Is it a settled scheme passed by Government, or is it merely a tentative one?—I would not describe it as a scheme. You will remember, when the Lloyd Barrage was first passed by the Legislative Council, Sir Chimanlal Setalvad, who was then the Member for Irrigation, made a statement in Council that this area would be reserved for meeting local claims. There was considerable apprehension at the time that Government might sell away the land to non-Sindhi outsiders, and that the interests of the local zamindars would be entirely neglected. This assurance was given to them then and, as far as I know, Government have every intention of regarding that as a promise.

59080. *Sir Chunilal Mehta:* Was it only for *mohag*?—For meeting all concessionary grants. The figure was regarded at the time as a maximum, sufficient to meet all claims of existing zamindars over Government lands in the area.

59081. *Mr. Jamshed Mehta:* Do you know that Government have lately brought out a scheme for agricultural bias education for Bombay Presidency?—I have not seen it.

59082. *Sir Thomas Middleton:* You informed us that the ordinary assessment for grass land in Sind would be twelve annas. Could you give us, for comparison, what the rate would be, for similar land, for cotton, rice, etcetera?—The ordinary rice rate in Sind at present ranges from about Rs. 3-8-0 to about Rs. 7-8-0, the average being about Rs. 5 per acre; cotton Rs. 2-8-0 to Rs. 5; other *kharif* rates for millet, *bajri*, *juari* and so on would be about Rs. 2 to Rs. 3-8-0. The rates depend a great deal on the position of the land, whether it is lift or flow, and the character of the water supply.

59083. Sugarcane land?—Sugarcane is very little grown in Sind. I am not familiar with it, but I imagine it would be usually about the rice rate or a little less. On the left bank of the Indus and in Eastern Nara tract it is assessed at rates from Rs. 1-12-0 to Rs. 4, but the water supply for this crop is not sufficient, and it is very little grown.

59084. You have suggested that too much reliance should not be placed on the livestock census in Sind. I think the practice in Sind is to collect figures once in five years?—Yes.

59085. Is there a special date or time for making the returns?—No; I do not think there is a uniform date for the whole area. In the course of his work the *tapedar* makes enquiries in various villages; there is no special staff or enumerators appointed to do the work.

59086. The village accountant collects the figures, and these figures find their way to the Department of Agriculture?—Yes; they are consolidated at various stages. The village accountant sends in his return to the taluka

headquarters; they are consolidated for talukas; then they go to the subdivisional offices and the district offices, and eventually reach the central office.

59087. Does any one check the figures at any stage; does any one in the taluka office examine the village accountant's figures to see that they are not a repetition of those of the last census?—That depends upon the individual officer; one exercises such control as one can; one has a great deal of work to do and it is not possible to check every figure by any means; but if one gets a return which seems to be palpably absurd, one will examine how it was arrived at. But the figures have a certain value. When one is collecting figures relating to goats, buffaloes and other horned cattle, there is no reason why the percentage of error should be greater in the one case than in the case of the other, and the figures have at any rate a relative value.

59088. There is no reason why the village accountant should seek to increase or decrease the figures; he gives proportions?—Undoubtedly if the returns were taken now in certain areas of Sind, where there have been recently calamitous floods, every village accountant would take great care to see that there is a great decrease in number.

59089. One gets fair approximations?—I cannot say that you get approximations to the total number, but the relative proportion that one district bears to another is constant.

59090. Taking India as a whole, up to about 1913-14 the livestock figures varied very much. Obviously, no great reliance could be placed upon them. But since that time there has been considerable constancy. The returns could only be constant on the assumption that total numbers in fact remained constant and that errors in detail cancelled out or that the village accountant kept a note of the last returns and copied the same figures?—I should think both those methods are adopted to some extent. Undoubtedly, a great many people look up their last returns and bring forward a figure by the use of which they think they may escape criticism. If a certain figure satisfied the officer five years before, and this did not vary materially from it, probably this would not call for an examination.

59091. Is the accountant supposed to count the livestock?—That is what he is supposed to do in the course of his enquiries.

59092. That should not give much extra trouble; he can make the count when he is making other enquiries?—There is no reason why he should not do it.

59093. I am trying to find out the chances of error that might arise in enumeration?—The staff is very ill-paid in comparison with the importance of the duties which they have to do, and they are pretty heavily worked, so that any piece of work which they regard as an extra is rather liable to be scamped.

59094. I have seen the large number of forms a village accountant must keep, but in this particular case it seemed to me that when travelling in an area it would be a simple thing for village officers to get the required information, and most of them would be likely to get the figures fairly correctly?—It would be simple if they always found the people on the land when they inspected it, but they might do the inspection of a whole area, a large number of the fields, and never come across a cultivator who has a knowledge of the facts there.

59095. So far as actual working bullocks are concerned, I should think the village accountant knew pretty well what each man in the village had?—I do not think that is so. He has a fairly large area; a village accountant might have seven or eight villages, an average of about 2,000 acres in extent; that is a fairly large tract of country. In Sind it is not the custom of the people, as it is in most parts of the Presidency, to live in very big villages; in Sind they live in small villages, hamlets, scattered about their fields.

59096. *Mr. Calvert:* Do you find that the rise in the price of land for the last fifteen years has led to much increase in borrowings?—Certainly, that is so.

59097. Then, with this new Barrage scheme and the enormous rise in the value of land which may be anticipated, would indebtedness increase?—I should think it would; I see no reason why it should not.

59098. Could you suggest any measure for fighting that evil?—I am not sure that it is necessarily an evil.

59099. I am assuming that most of the borrowing is unproductive?—Well, there are various things which would tend to reduce uneconomic borrowing. One of them of course is legislation on the lines of the Punjab Land Alienation Act. The principal thing to be said in favour of it (I am speaking merely from the economic standpoint and expressing no opinion on the political aspect of the case) is that it would tend to prevent uneconomic borrowing by the more unthrifty of the Mahommedan zamindars.

59100. In the rights to be given to your cultivators, is it suggested that there should be no restriction on the right of mortgage?—I think there would be at any rate some kind of restriction on alienation, and probably on mortgage, in the case of those lands which are to be given out at concession rates. It is obviously quite impossible for us to give very large areas of land to zamindars at a rate of fifteen rupees or less if the zamindars are going to be immediately free to put that land on the market and get two hundred rupees an acre for it. But it has not been suggested that in the case of lands sold under ordinary auctions there should be any restriction on alienation.

59101. There would be free auction?—I imagine that would be so.

59102. Is the cost of clearing the land to be brought under cultivation heavy?—It varies with the soil. I do not think it would be very heavy. There are lands covered with timber, but the value of that timber would represent more than the cost of clearance. A great part of the land is fairly level. But there are places which are overgrown with jungle which is not of very great value, and that is the land that might be dealt with in the first instance by being leased for a certain number of years on condition that it was prepared and cleared.

59103. The cost of clearing for irrigation will not by itself be a powerful cause of indebtedness?—I should think not; not the actual clearing of land.

59104. *Dr. Hyder:* I have the map of your Presidency before me, and I find the easiest way to get to the seat of Government from Sind is by sea?—Otherwise you have to make a detour. In the monsoon one travels by train. It takes forty-eight hours by train and thirty-six hours by sea.

59105. Are you well served by the Bombay Government as regards agricultural administration when it takes two days for a man to get here?—I do not quite see what the Government of Bombay have to do with it, unless you say that they ought to have pressed for more rapid railway communication.

59106. The administrative head might be seated at Poona, and it might be very difficult for him to know about the Upper Sind Frontier district?—I am afraid I do not really follow the question. It seems to me that one might know a great deal about country which is more than two days' distance away although it would undoubtedly be more convenient, if one wanted to inspect the Upper Sind Frontier district, if one could cover the distance in two hours instead of in two days.

59107. You mention priest-craft as one of the sources of agricultural indebtedness. Do these men descend upon the cultivators, like a swarm of locusts, eat up their substance and depart leaving behind only the odour of their sanctity?—I would not put it so strongly. There is a very large class of Mahommedan *fakirs* and Hindu *bawas* who, not being a productive class, take a certain share of the produce to which they contribute very little. More or less cognate to this question is, of course, the general retardation of agricultural improvement owing to the religious customs of the country; the Hindu veneration of the cow prevents that animal being fully exploited for agricultural purposes; the Mahommedan refusal to take interest is also a thing which retards progress, and the refusal of both to have anything to do with that useful gentleman, the pig, is another. It is not exactly priest-

craft; what I have in mind is, that the influence of organised religion does not do anything to help agriculture.

59108. What is the nature of the rights of *haris* in the land?—They have no right in the land.

59109. They are tenants at will?—Yes, pure and simple.

59110. The majority of the people of Sind belong to this category of *haris;* most of the cultivators are *haris;* they have no particular interest in the land, and their relationship with the zamindar is purely personal?—No doubt a large number of *haris* do always, for many years, cultivate the same piece of land, but they have no actual right in the land.

59111. You said, in answer to a question, that your ideal was to set up small holders on the Government waste lands when they are commanded by the Lloyd Barrage scheme?—I do not wish to imply that all land should be given to small holders. But I do think there is considerable scope for the encouragement of small holders, and the small holder is likely to give very good results from the point of view of Government revenue and also the general development of the tract; the *hari* may be expected to work better when he is working to serve his own interests than when he is working for a zamindar.

59112. Would you have the area dominated by the small man?—The small man is already predominant. There are large areas in Sind which are run by small zamindars. As I have pointed out, thirty-six acres is the average size of a holding; seventy-five per cent of the holdings are under twenty-five acres.

59113. As regards the influx of the Punjabis, you say that the Punjabi is a very valuable gentleman and a very good cultivator. I dare say you will agree that the Chinaman is a much more capable and aggreable man. But would you agree to import the Chinese into Sind?—I should not be prepared to recommend the importation of the Chinese. I do not think the question is likely to arise.

59114. Your responsibilities as an administrator are mainly to the people of Sind. Would you like to see the Punjabis swamping Sind?—I do not see any possibility or any likelihood of that.

59115. As regards sale of land by auction, would you like to limit the quantity of land to be bought at the auction by one individual?—That is a matter in which I have an open mind. I can quite conceive that in some particular cases it might be to the advantage of Government and the people generally to have a large block of land in the hand of a particular man; but generally speaking, that question will not arise because there are very few places where it would be possible to give a very large block of land to one man. The land is fragmented, and the number of places in which, there is more than 500 acres in one block is very small indeed.

59116. You say the fuel problem is not acute in Sind?—There is a great deal of scrub jungle, and there are forests mainly near the banks of the river.

59117. *Sir Chunilal Mehta:* You were on special duty to visit the Punjab; how long did your visit last?—For about six weeks, about the beginning of 1926, and I went to Bikaner on my way from the Punjab.

59118. And you studied all the conditions in the Punjab that may bear upon the Lloyd Barrage?—That was my object in going there.

59119. You are aware that the cost of the Sakrand farm is now being met out of current revenues, and that the Government of Bombay were not allowed to put it on to the Lloyd Barrage scheme so that the necessary money might be spent from loan funds?—Yes.

59120. There is a limitation to multiplying the number of such farms if the expenses are to be met from current revenues in the present financial state of the Bombay Government?—That is certainly so.

59121. These farms do not bring in any revenue, for many years at least; they are research farms and they are not supposed to yield revenue?—Yes.

59122. I agree with your remarks regarding co-operative farming; but supposing a co-operative society were formed in order to supply facilities for educated young men to take to farming; supposing that the society contained

certain well known gentlemen who raised funds in the first instance for buying the land and that they chose to send say twenty-five to thirty young men, who were keen on farming and who were known to the members of the society, to the Poona Agricultural College for the short course of six months or a year to get acquainted with agricultural methods, and they were then perhaps put in charge of an expert, somebody who knew how to deal with agricultural problems in Sind, could plots of land be given to such societies?—Are you suggesting that the society should be formed now, that they should first of all get the land and then send the men for training? If so, what will happen to the land in the meanwhile?

59123. Form the society now, give the young men the training, also select somebody to be in charge of their operations and to teach them, and also make the condition that they should work on the land and not get into the habit of working as zamindars or being rent-receivers, would the scheme work?—I would not say that the scheme would not work, and I would be prepared to encourage such a society and try to make it work. One has no experience whether these people would work on the land; they have shown very little promise that they would do so. But certainly if a scheme of that kind were brought forward it would deserve very great encouragement.

59124. I was thinking of that as a sort of alternative scheme to your suggestion that the young fellows, perhaps having the letters "B.A." after their names should work as *haris*. Perhaps they would then learn more than the ordinary agriculturists, but I do not see any prospect of their working as *haris* yet. In these circumstances would a scheme of this character be likely to get consideration as regards the supply of land, especially at market rates?—One thing which I think is necessary to insist on is that he should not become, and he should not be encouraged to become, a mere rent-receiver living on other people's labour. If he could be taught to work with his own hand and by his own labour to erect himself into the position of a zamindar, I think it would be an excellent thing to give all the encouragement that one can. The thing is happening all over Sind; small men in the Jamrao (there are large numbers of them) who started as *abadgars* have, by working with their own hands, saved money and bought land in Sind and erected themselves into zamindars. They are now going all over Sind and buying land. There is no reason why an educated young man should not work with his own hand, save money and prosper. I do not suggest that he should be tied to the land for the rest of his life, but if you can teach him to work, with his brains and superior character he ought to be able to get on.

59125. I agree with you that the greatest possible discouragement should be placed on any inclination to become rent-receivers. My scheme is something on the lines of co-operative housing societies. If I become a member of a housing society I am prevented from selling the house which they provide for me to somebody else without the permission of the society. The object is not to enable me to make an immediate profit?—The difficulty I had apprehended is this: you say that the society would pay full rates; presumably they would want to pay in instalments?

59126. Yes?—If the members of the society are turned out for various reasons, then who is to be responsible for the payment of the remaining instalments?

59127. The society would consist of people whom the Revenue Officer would approve. After all, the land is worth something, and it would be security?—It would be rather difficult if the land were granted to a society and some of the members defalcated. I think a way could be found over this matter; I would certainly be prepared to consider such a scheme very sympathetically and do what I could to make it a success.

59128. I was thinking further that if there were societies of this character, they might be able to buy and hire out implements like tractors, which an individual holding 25 acres might not be able to buy?—That is probably a question on which the Assistant Registrar of Co-operative Societies, whom you are going to examine, would be able to speak.

59129. There would be no objection from the Revenue Officer's point of view to sell lands to such societies?—None at all.

59130. On page 39, you say that you hope that it will be found possible to tackle the question of consolidation in Sind on the lines of the Punjab, but you think that legislation would be necessary, at least most helpful, to bring in recalcitrant members to join any co-operative scheme?—So far as I remember, the question was a somewhat hypothetical one, whether under certain conditions I would approve of compulsion. In the present circumstances of Sind, I do not think Sind is ripe for legislation of this character, and it has, in fact, been excluded from the Bill which is at present before the Legislative Council of Bombay (Small Holdings Bill). There are very good reasons for the exclusion; in the first place, land in Sind, even when it is held by a very large number of co-sharers, is not divided on the ground: it is cultivated jointly and the produce is shared; that is generally the case. But it is true that in the last twenty years there has been a distinct movement towards actual sub-division on the land; it seems to have caught on in one or two areas, particularly; in Ratodero there is a good deal of it, and in Kandiaro. In one village I have discovered survery numbers divided into as many as fourteen pieces; but that tendency is not at present very marked, and I think all that is wanted at present is, first of all, to prevent civil courts recognising or ordering partitions below a certain figure; secondly, Government should refuse to enter in any official record of rights sub-divisions below a certain figure; thirdly, more important than any perhaps, the Irrigation Department should refuse to recognise a holding below a certain area as a unit for irrigation purposes: that is, that they should refuse to make separate arrangements for irrigation of a holding below a certain figure.

59131. What is *hakabo*?—*Hakabo* is a water rate which is charged to *jagirdars* who do not pay land revenue but pay a certain light water rate; it is intended to represent the cost of irrigation; any considerable improvement in irrigation is accompanied by a rise in the *hakabo*. But in olden days it was certainly loosely used as meaning any kind of water rate; nowadays as a technical term its use is confined to *jagirdar* lands.

59132. Was there any obligation, so far as you are aware, to spend whatever was received in the shape of *hakabo* on silt clearance?—No, I am not aware that any definite obligation was ever undertaken. I think that somewhere about the seventies an additional rate was levied from certain lands which was afterwards consolidated with land revenue, and it was said that this should be spent on the maintenance of canals, which included silt clearance. In those days, probably much greater importance was attached to silt clearance and silt clearance alone by engineers, because it was the infancy of the department and silt clearance was the most obvious thing to keep the canals in order. Now, of course, a great deal is done other than silt clearance, and it is a matter of some controversy as to the extent to which silt clearance is necessary. A great many old fashioned zamindars still think that the more they clear a canal the better their water supply is bound to be. That is not a view which is accepted by the engineers generally.

(The witness withdrew.)

Khan Bahadur SHAH NAWAZ KHAN BHUTTO, C.I.E., O.B.E.

Replies to the Questionnaire.

QUESTION 1.—RESEARCH.—(*i*) I am afraid this is too large a question for me to shed enough light upon, in my answer, without making it appear unwieldy. Our trouble in the Province of Sind is not want of improvement schemes, researches, analysing results, want of propaganda, publicity or demonstrations, but to make agriculture more paying, which, on account of having come to be known as not in the least a paying industry has gone on losing labourers instead of attracting them, so much so that we are at present working our land with hardly one-fourth the number of men that otherwise would be required if we are to adopt improved methods of cultivation. Researches into indigenous methods, (our present ones are very old) are necessary but I really cannot understand how they could be made to produce profitable results to suit different places. India, as a whole, does not follow the same methods of cultivation; they are different in different places according to the climatic conditions. Even in Sind the methods are not exactly uniform. In the *Lar* portion with so much water-logging and damp climate responsible for keeping people indolent and idle, we cannot expect much improvement. It will be sheer waste of energy to attempt to find improved methods for them. In Upper Sind districts the climate is very hot and the time for doing work is very short; there the methods of milder places will not suit. I do not know whether researches for so many different places could be undertaken, because so much money would be required that India would find itself unable to afford it.

(*ii*) *Veterinary research.*—My remarks apply equally to research in the veterinary branch. The animals—bulls, cows etcetera, may not be equally useful for all places, *e.g.*, the same milch cows giving so much milk in one place may be found suddenly to turn dry in other places. In the same manner, fat bullocks doing excellent work in cooler countries, may be found useless in hot places where alone strong bone and skin and not flesh would keep them working. I do not know; you may undertake researches but the results may not be commensurate with the amount of money spent on them. Try, but every step in this direction requires to be taken with the utmost care, because after doing such expensive work, you find that you are no better and all your money is wasted on so many research institutions. I am not one of those pessimistic people who despair of good in research institutes, but my experience and knowledge of how these researches have worked show the necessity of caution.

(*b*) In Sind, in different parts, many researches have been instituted and the majority of them have not been I am sure, attended with success. This I take to be due, not to want of skilled workers or of field or laboratory facilities, but to causes to which the climate and the inadequacy of water supply facilities largely contribute.

(*c*) Siltless water turns very rich soils into *kallar* ones; the land adjoining the banks of canals carrying water above their levels are at once turned into *kalar* and eventually become unfit for producing crops. These points require investigation. No way of escape has yet been found from the scourge of pests like locusts, crickets, etcetera, which in every year do so much damage to the crops. Ringing of bells or sounds produced by striking metals against each other to frighten away locusts, have not succeeded as they are too deaf to heed them. Rats sometimes do incalculable damage to crops. No device has yet succeeded in extirpating this pestilence. I do not know whether this Commission is going to recommend any research in this direction in the interests of agriculture but the pest question certainly requires investigation, if not in preference to other problems, at least along with them. I do not know if, in any other country, these pests do so much harm as in Sind and continue doing it with impunity.

Khan Bahadur Shah Nawaz Khan Bhutto.

QUESTION 2.—AGRICULTURAL EDUCATION.—In Sind, as yet, progress in the direction of starting agricultural institutions has not been marked. It has only begun. In a few places, classes have been attached, and that too only very recently, to primary schools but they have not yet shown any indication of success.

(*i*) Does not arise.

(*ii*) Throughout Sind. In my opinion, classes should be attached to all schools and education in agriculture should be compulsorily imparted to students, and, if possible, from ten to twenty acres of good land commanding free flow should be provided as adjuncts to schools for practical knowledge. Agricultural schools to train up the present rural school master in practical agriculture should be opened in all the district towns of Sind, and then it will be possible to give adequate attention to agriculture in rural schools. It must be done in Sind, which is an essentially agricultural Province.

(*iii*) Agricultural class teachers and, if possible, the head masters should be drawn from the agricultural classes.

(*iv*) I have already stated that we have, in Sind, no school where agriculture is taught in a practical manner.

(*v*) I would suggest that Government should make a rule that any student showing a bent towards agriculture should be awarded at the end of his school career, ten acres of good land free of *malkana*, to give him an opportunity to put into practice the theoretical knowledge which he has acquired in school and thus to make him stick to his father's profession with advantage.

(*vi*) Does not arise because there is no agricultural school. We have one at Poona, started by Government for the whole Presidency; but unfortunately it is impossible for us to attract to it students belonging to the agricultural classes from our Province who, on account of poverty, cannot even claim their souls to be their own. It is therefore full at present of students drawn from different classes, not agricultural only, and the result is that after finishing their students' career, these students, with the exception of a few, take to Government service, finding it more paying to follow other pursuits in life than agriculture, which is not in the least a paying industry in our Province.

(*vii*) As there is no agricultural school in Sind, this question cannot be answered on behalf of Sind.

(*viii*) I have already stated that each rural school should be attached to a farm where agriculture in all its bearings should be taught practically.

(*ix*) They have at present very disappointing careers because it has not been possible for most of them to take up an agricultural career after finishing with their studies.

(*x*) Not until some methods are found to make agriculture more paying, approaching, in its return, to yields from other industries.

(*xi*) Absolutely none, which is the most modest expression that I can use. Huge humbug is so much resorted to, but with absolutely no result.

(*xii*) I have already said, by grant of awards of land to the most deserving of the students taught in the classes that I wish to see attached to all schools.

(*xiii*) All these classes should be under the control of district local boards, among whom I hope, as time progresses, there will be improvement in membership.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(*a*) Demonstration and propaganda work depends for its success very much upon the kind of agency employed in administrative work. In Sind of late we have, under Dr. Mann, two lieutenants, K. B. Gulmahomed and K. B. Azimkhan who both appear to be well-placed in their jobs for their different duties—one doing research and the other demonstration and propaganda. They are doing good work to begin with, and require to be encouraged to continue their good work.

(*b*) Increase the activities of the department, increase its establishment, increase the demonstration of implements and tools, including ploughs, introduce good bulls, introduce tractors and threshing machines three or four of

which should be available in each district headquarters if possible. I would go still further and say that each taluka should be given one tractor and one threshing machine, to be given out on hire and worked by the agency of the department, so that we should see the results that are claimed for them; and the rate of hire should be fixed in consideration of those results.

(*c*) I do not know, but if experts were able to convince people of the claims that they make, there would be no difficulty in inducing cultivators to adopt their advice.

(*d*) The methods employed in Sind are yet in their infancy and I do not know whether any striking instance of a failure or a great success has yet occurred which may be cited.

QUESTION 4.—ADMINISTRATION.—(*a*) I am always against centralisation. There is much to gain by entrusting the work to one Government rather than make it wait for advice or instruction in the conduct of that work.

(*b*) I do not want the Government of India to come in between our improvements and Local Governments. The latter should be trusted; much better if they are left unhampered by interference from any other higher authorities.

(*c*) (*i*) The Agricultural and Veterinary services do not appear to be thoroughly efficient but they cannot be better with the funds at present available.

(*ii*) I hope that if the present rate of progress is maintained, railways and steamers ought, in course of time, to be equal to the demands of agriculture.

(*iii*) Our chief lack, in Sind, is roads. No roads worth mentioning are kept up by Government, and this indifferent provision of roads has resulted in an enormous set-back to progress in agriculture. I have known of instances where produce was harvested, cleared, kept ready, but was allowed to lie and go to waste and be eaten up by birds and beasts on account of lack of facilities for transport. These things ought to improve if Government were brought to attach to them the importance they deserve.

(*iv*) A Meteorological Department does exist, but I do not know if it is of any good to agriculturists who do not know that it exists. Publication of the results of their observations about forecasts in the Government Gazette in English does not reach agriculturists. Accordingly, this department is looked upon as another white elephant kept up by the Government.

(*v*) and (*vi*) They are all right according to the present requirements. I would rather suggest, as all things cannot be done at the same time, that progress in all these lines should be maintained.

QUESTION 5.—FINANCE.—(*a*) and (*b*) According to my view none of the means employed hitherto to finance agriculture have succeeded; this is not due to any fault on the part of agriculture; it is because, as yet, no effective means has been found to make agriculture in our Province a paying industry. Consequently, the result is that agricultural indebtedness has become chronic, and repayment of loans and advances is not as easy as it ought to be.

I have very little to say in favour of, but much against, the system by which *taccavi* is advanced by Government. In the first place, the interest charged requires to be pitched as low as possible. Over six per cent interest, the present rate, is too much for an agriculturist to pay. I really do not understand why Government should not make it as low as what the Imperial Bank pays on deposits.

As much as fifteen per cent of a *taccavi* loan filters away from the time the *taccavi* leaves the Government office till it reaches the agriculturist; and the Damocles' sword of Government that hangs over the head of the borrower until he makes repayment of instalments on exact dates, depending, as he does, for repayment on the realisation of his uncertain crops, dependent upon the vagaries of the most notorious Indus—these may be mentioned as reasons that have hitherto struck at the root of the popularity of *taccavi*

and have compelled people to borrow from money-lenders at double and triple rates of interest, rather than take Government *taccavi*.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—(c) All such measures—the application of the Usurious Loans Act, restricting or contracting the credit of cultivators, or limiting the right of mortgage or sale, or making the redemption of mortgage easier,—these are all merely temporary remedies which only lessen the credit of cultivators. These, however, do not exhaust the possibilities by which their conditions could be improved because, according to my view, impoverishment is not due to their lavishness but to their failure to get a living wage from their work on the land. These remedies have hitherto not succeeded in reaching the root cause, which is the incapability of the land hitherto to supply a living wage for the workers on it. These measures may be employed where necessary, but, first of all, steps should be taken to make agriculture a paying concern which at present it is not, as compared with profits from other industries or labour pursuits. At present, in Sind, it means complete distress and disaster if there are two successive bad years.

QUESTION 7.—FRAGMENTATION OF HOLDINGS.—This is a very important question, especially as applicable to the Province of Sind, where agriculture is mostly in the hands of the Mahommedan population with a rigid law of inheritance. This law is very ruinous and many generations of wise heads have not been able to improve it to any extent. For instance, if a Mahommedan with a seven-*jerabes* holding dies leaving seven sons, according to Mahommedan law, each must receive an equal share; not only so but out of those seven *jerabes*, sisters, daughters, mother must receive a share. What this involves in sub-division everybody knows, and so much land must come under boundary lines. I am not exaggerating when I say that in an instance of seven *jerabes* divided as indicated above, nearly one-quarter of the land would go, or rather be wasted, under boundary lines. This fragmentation has caused much loss and, in some cases, the almost total extinction of families as traditional zamindars. I do not know whether Government could interfere in this but I hope that, in the present civilisation, even the bluntest Mahommedan ought to consider it very necessary to consent to the revision of our law of inheritance. Fragmentation beyond a certain limit should be totally restricted by some legal enactment. This seems to be necessary and Government should do it, if not in our interest, then in the interest of its own land revenue collection; because, one of these days, it will find itself in a most difficult position as regards making recoveries from the too numerous petty small-holders.

QUESTION 8.—IRRIGATION.—In our Province, notwithstanding the number of irrigation systems that have been provided, we do not find ourselves immune from distress or sometimes disaster, from droughts and deluges and we have places where as yet no effective means exist to save our crops from being eroded and washed away by floods. No arrangements exist in any place to drain off the excessive flooding caused by rivers over-flowing or by breaches in *bunds* or by downpours of rain. In Sind, we depend for our irrigation supplies on the Indus—the most capricious river known in the world. Of late, owing to so many schemes maturing in the Punjab and in its upper reaches, which are responsible for much reduction in it, we have ceased to get water in the proper season and sufficient for inundation overflooding. This river is now in course of being husbanded and brought under control at a cost of some twenty crores of rupees. People have many misgivings about the success of this huge project but I have had to consent to its being undertaken after a very great struggle in my mind. The fact that our Province of Sind receives a most inadequate water supply is evident in the large tracts of excellent cultivable lands lying waste and unoccupied. Our Province is essentially an agricultural one and yet, on account of want of adequate means of carrying water to all its parts, is known as the Desert Province. I have seen most of the Indian Provinces and my conclusion, after a study of the irrigation conditions as they exist in several of them, is that our Province is a most neglected one, in which improvements have proceeded, very slowly.

Khan Bahadur Shah Nawaz Khan Bhutto.

Our Barrage is intended to provide a perennial supply of water. If it cannot do that I am afraid all our money on it will be ill-spent. This Barrage affects only what is known in our Province as Upper Sind and does not affect an equally large, if not larger, part of it, Lower Sind. There will remain other parts where we must provide canals which will give people, if not a perennial supply, at least sufficient inundation season supply, which at present they get. It is feared that after the Barrage has been constructed this will be considerably contracted. I am going to mention our Begari Canal on which I possess most of my land. It is a canal of sufficiently big size but it miserably fails to meet the calls for water of the land commanded by it. The details of the land situated about this canal shows that much of it is allowed to lie uncultivated and unoccupied. The Begari country if provided with proper sources of water, ought to support at least thrice the number of its present population, most of whom now, on account of having to live on the starvation line, resort to the commission of thefts and depredations, making the lives of the few prosperous people insecure. Consider the question of the country below the reaches of the Barrage. That country, I mean about and below Kotri, ought to be provided with another barrage on the river to give people water at a higher level, otherwise I am afraid the Lloyd Barrage will leave them in a much worse position than they are in at present.

(*ii*) and (*iii*) About tanks, ponds and wells, of which we have very few in Sind on which we can depend solely for agriculture, I think enough is being done towards providing new ones or keeping the existing ones efficient, and I think the local Government may be trusted to do all that is necessary.

There are no natural obstacles but of course there are artificial ones. Lack of money, and lack of interest on account of our Province being so far away from the seat of Government, are the only reasons that account for the lack of that extension of cultivation which is so necessary for providing the population with a living wage.

(*b*) I am not. In most places detailed distribution is left to landholders who break each others' heads, and in some places where distribution is done by Government officials it is a source of annoyance and mischief and leaves so much authority in the hands of subordinate officials whom nobody can expect to exercise it honestly. In my opinion, the detailed distribution should be left to the landholders. Government should concern itself only with providing water for private distribution in proportion to areas depending on their distributaries. Government canals should be so well arranged, for example, by putting in regulators, falls, and undertaking clearances, that they will provide supplies at the mouths of all the distributaries. At present it is not so. The canals are worked so badly that we find that, in most cases, lands situated in the upper reaches leave very little water for the tail lands. No system yet tried has succeeded in making distribution even over the whole length of the canal.

QUESTION 9.—SOILS.—(*a*) (*i*) According to my view, to spend money in improving soils by Government is out of the question. Soils get very much improved by Nature's ways, which provides silt water for flushing *kallar* lands. Leave this work to the holders. You cannot be equal to all the demands called for in this direction.

(*ii*) I am not prepared to recommend any Government money being spent on reclamation of alkali or uncultivable land. All that ought to be done is to provide sufficient water to flush and drain off such lands, and any land which cannot be improved by this method is better left alone. It is not likely to be improved and it is a waste of money to try.

(*iii*) With our mad river it is needless to spend money to prevent erosion.

(*b*) I know of no such instances and I can give none but I have many instances to give where money has been spent to no purpose.

(*c*) Give them *gratis* to the cultivators, if possible to small men of the peasant class, providing of course ample water for irrigation.

QUESTION 10.—FERTILISERS.—(*d*) I do not know of any place where an increase in the use of manures has come about. We can only find manure for very small patches of land, not for whole areas. Will it not be prohibitively expensive to attempt to manure every soil at places where manure is not available?

(*e*) Not to my knowledge.

(*f*) It is impossible to effect any change in this direction. People who use cowdung for fuel must continue to do so, because they have no other fuel to fall back upon. They know that cowdung smoke is injurious to their eyes but they cannot help it.

QUESTION 11.—CROPS.—(*i*) In our Province where labour is so scarce, the present crops must continue because they require least labour. Of course land that is cultivated with rice, as long as it continues to yield, as at present, a return equal to what is obtained from other crops, costs least labour. We cannot replace it by other crops to save water because we shall not have the cultivators nor the manure necessary to succeed with other crops. My own idea is that unless Government is prepared to employ steamers to import large numbers of *haris* from other countries, nothing should be done to discourage rice cultivation in which alone we have been able to succeed in spite of labour difficulties.

(*ii*) Rice cultivation supplies so much fodder that I, having most of my holding under rice cultivation, have never found myself in difficulty for want of fodder, but have such an abundant supply that I am able to sell the excess.

(*iii*) I think the present distribution is all right. It should be left entirely to the zamindars whose methods are good and will improve in the ordinary course and become more economic. I have noticed improvements already being effected in this direction; for example, during the last ten years, in some places the quantity of seed used has decreased by nearly half.

(*iv*) I think the local authorities are doing what is necessary in this direction by granting licenses to people living in neighbourhoods infested by wild animals.

(*b*) I have already stated that, as far as possible, in our Province the cultivation of rice may be encouraged to the exclusion of all other crops, the rotation of other crops such as wheat, cotton, *juar*, grain and oil seeds being left to those who, owing to lack of the large quantities of water required for rice, find it profitable to cultivate these crops for export.

(*c*) The substitution of paddy for other crops has proved most profitable and has been the means of bringing much land under cultivation in spite of the scarcity of labour.

QUESTION 12.—CULTIVATION.—(*i*) and (*ii*). In the selection and rotation of crops, the cultivators are doing what is best, growing wheat and gram in rotation. Any interference would be inadvisable.

QUESTION 13.—CROP PROTECTION, INTERNAL AND EXTERNAL.—(*i*) The small amount of work that has been done in this direction has so far failed to produce good results. It has not been found possible to deal effectively with the rat pest and now, in my neighbourhood, the cricket has come to harass the cultivator. It has been found to be impossible to deal with locusts, the destruction of a few eggs here and there being merely a waste of money.

QUESTION 14.—IMPLEMENTS.—(*a*) Some improvement is taking place, but greater and steadier progress is necessary. All that is required is that Government should allot more funds for the purchase of improved implements which, if possible, should be distributed free among the cultivators. A sufficient number of officers should be employed to go round merely to see whether these implements are being worked properly or require correction and to make arrangements for repair. Otherwise what happens is that such implements, when they become damaged or out of order, are thrown aside as useless for want of mechanics to repair them.

(*c*) The only difficulty is that prices are too high. Prices of implements should be brought down to the capacity of the cultivator to pay through a system of Government bounties.

QUESTION 15.—VETERINARY.—(*a*) I think it should be under the Director of Agriculture because he alone can see what improvements ought to take place to make it equal to the demands of agriculture.

(*b*) (*i*) The present dispensaries are under district local boards. But officers appointed in their charge do not consider themselves wholly subordinate to local boards which fact sometimes turns their heads and makes them offensive and irresponsible.

(*ii*) Extension is needed and is being attended to.

(*iii*) No. It can only be done at the cost of their popularity which they as yet have not attained.

(*c*) (*i*) Agriculturists mostly resort to the indigenous methods of treating their sick animals, finding it so difficult to go to dispensaries which are not at present situated within easy reach of every one. At present we have not even one dispensary to a taluka.

(*ii*) In our district, doctors go about the villages and attend to cases brought to their notice but owing to the shortness of their stay in the village are compelled to leave their patients before recovery.

(*d*) Legislation is very necessary to prevent the spread of contagious disease by contact.

(*e*) I am not prepared to say because I do not know much about it.

(*f*) We have never given a trial to preventive inoculation, and I am unable to say anything for or against its efficiency.

(*g*) I think every Province must have at least one such research institute.

QUESTION 16.—ANIMAL HUSBANDRY.—(*a*) (*i*) I have no special suggestion to make. I only wish that the efforts that are being made shall not be allowed to relax. Improvement in this direction cannot be secured merely by spending money but will be secured by continuing the gradual and steady work which is at present being done by the Local Government to whom this work should be left.

(*ii*) The dairy industry is not known in our Province. I have heard of a dairy being started at Malir or Landhi near Karachi but I do not know if it has yet been made to pay. I know of one started at Ruk which on account of its having proved to be not paying has had to be abandoned.

(*b*) (*i*) I have never heard of any overstocking of pastures resulting in any injury to animals.

(*ii*) We have no enclosed pastures, to speak of, in our Province. All our livestock depends on grass that we provide for them at home. We usually send them for grazing and exercise to our own pastures or grazing grounds outside the district.

(*iii*) We have not experienced it in ordinary good years because the river, on which we depend, always carries enough water to give us sufficient fodder crops in some part of the Province.

(*iv*) Our animals are so brought up that they do not depend on green fodder but can live on dry fodder. Green fodder, where procurable, is too costly to be within the reach of everybody.

(*c*) I have already stated that we do not experience that scarcity of fodder which the question suggests. In my whole life I remember only two such occasions and then we were able to tide over by importing grass from neighbouring Provinces.

(*d*) It is not necessary in our Province.

(*e*) The interest which they are taking at present is sufficient.

QUESTION 17.—AGRICULTURAL INDUSTRIES.—(*a*) He toils throughout the year. During the intervals of one or two months in every season he is

engaged in clearing jungle, improving his land, ploughing, clearing silt in the canals, etc.

(*b*) Subsidiary industries have almost died out owing to their failure in competition with imported articles of better quality and finish put upon the market at lower prices. Mr. Gandhi is endeavouring to revive one home industry and his effort should be encouraged.

(*c*) Our agriculture at present requires whole time labour not only from the males but from the females also. This constitutes an obstacle to the expansion of subsidiary industries.

(*d*) Government may please themselves. People have already commenced to do these things for themselves. The only way in which Government can encourage them is by grants-in-aid and protection.

(*e*) The cultivators have no time to devote to subsidiary industries.

(*f*) I think Government may do that.

(*g*) No other means. Additional rural employment is not needed in our Province of which the present population is already insufficient to meet the demands of agriculture.

(*h*) District local boards and Government should be entrusted with this work and should steadily follow the methods they have adopted.

QUESTION 18.—AGRICULTURAL LABOUR.—(*a*) (*i*) Give them grants of land free and you will find swarms of labourers immigrating from places where there is a surplus, because otherwise they will starve in their homes. I am speaking of Sindhis, the emigration of whom out of Sind is unknown.

(*ii*) Provide water and grant land. In Sind there is no cultivable land remaining uncultivated.

(*b*) There is a deficiency of labour in our Province due to the unattractiveness of the agricultural industry which has proved to be the least paying industry and which does not give the *haris* a quarter of what they can get in wages as labourers in other industries.

(*c*) As I have already stated, the only way to get over this difficulty is by making agriculture more attractive by reducing the burdens and pressure on it.

QUESTION 19.—FORESTS.—(*a*) At present, as far as I can see, the forests in our Province are administered not to help agriculture but to supply fuel for towns and cities. People granted access to them have to pay more than they would otherwise spend on supplies of grass for their animals, in addition to the trouble and the difficulties put in their way by ingenious subordinates who sometimes prove a great nuisance.

(*b*) Twenty or thirty acres of land free of *malkana* and on nominal rent should be granted to every village to grow grass and firewood. I also propose that the existing forests should be handed over to the charge of district local boards.

(*c*) I do not know any instance.

(*d*) I am not yet convinced that afforestation can have any influence on rainfall or increase of moisture.

(*e*) No. In our Province our villages are congested and we have no space where afforestation may be promoted.

(*f*) The Forestry Department is so keen on maintaining the forests that it will not permit adequate grazing.

QUESTION 20.—MARKETING.—They are satisfactory in our Province; but the roads should be improved to facilitate transport of produce and railways should give priority to agricultural produce.

(*b*) I have nothing to complain of in this matter.

(*c*) Please do not interfere with the people who are doing all that is needed in the matter; you cannot improve upon their methods without spending money in ways which may be considered to be unproductive.

(*d*) I think this is most necessary but the co-operative societies should be utilised and not Government officers. The latter, on the excuse of being

already over-worked, may throw away your handbills, leaflets, and advertisements containing information which would be of great benefit if properly distributed.

QUESTION 22.—CO-OPERATION.—(*a*) The co-operative movement as at present instituted can only be encouraged and co-operated with, especially by Government officials whose interests at present appear in some instances to clash with those of the co-operative movement.

(*b*) Only this, that co-operative credit societies require advances of money at much easier rates of interest; otherwise not only is their popularity at stake but failure is almost certain. Advances are made to societies at rates of interest up to eight per cent though the societies can hardly realise six per cent on their most fortunate agricultural investments. How then can these co-operative societies be expected to succeed? Arrangements should be made to provide societies with money at lower rates of interest. I do not know whether I am asking too much when I suggest that the money may be lent at rates not higher than those which banks pay to their depositors.

(*c*) No such legislation is needed. Co-operation should succeed by its popularity. In Sind, so far, no such society exists or has been attempted.

(*d*) I have under me something like 200 societies and I think they are doing fairly well.

QUESTION 23.—GENERAL EDUCATION.—(*a*) In this Province we have no schools that have been started for the benefit of agriculturists as a class and in which only agriculture is taught. It would be very difficult to convert all primary schools into agricultural schools. We have very recently commenced agricultural classes in a few schools in some important places but have not yet provided the necessary facilities for agriculture to be taught in all its bearings. Let us hope we succeed. It all depends on money and co-operation of Government in providing agricultural farms commanding the best supply of water.

(*b*) (*i*) I have not yet been able to discover a way by which the agriculturist may retain agriculture as his profession in life and yet go through other courses of primary education.

(*ii*) We are just introducing compulsory education, but I am afraid scarcity of labour and want of appreciation will prove insurmountable difficulties which time alone will enable us to overcome.

(*iii*) The explanation is very simple: when boys become of an age when they can be employed in the fields they leave schools. In the Province of Sind, in some cases, the parents want to employ the improving intelligence of their sons in acquiring religious education by studying the *Kuran;* in other cases they put them into pursuits of life paying much better than agriculture which is the least paying.

QUESTION 24.—ATTRACTING CAPITAL.—(*a*) Make agriculture more paying by reducing the burden and pressure on the land. By burden, I mean the assessments and perquisites that the zamindar must pay to remain firm in his position as a zamindar. Pressure could be removed by opening new tracts and providing greater facilities for water, bearing in mind that in our Province of Sind owing to the scarcity of labour, only flow irrigated crops can succeed.

(*b*) The failure to secure adequate returns to the people working in agriculture. That is the main cause to be contended with, the only remedy being to reduce the burdens.

QUESTION 25.—WELFARE OF RURAL POPULATION.—(*a*) In our Province, this subject has been transferred to the district local boards who may be trusted to provide all that is necessary to promote hygiene and welfare. All that is necessary is that Government should consider this matter to be as important as the subjects of their reserved departments. In the Government's Budget only a few thousand rupees is provided for this subject; in fact it is a subject for which my experience as a legislator has taught me Government allots least money.

(*b*) It will not help much now. Time alone will help.

(*c*) I have conducted no enquiry nor seen the results of any enquiry conducted in places which I have visited in other parts of India.

QUESTION 26.—STATISTICS.—(*a*) The steps taken at present by the Local Government to collect statistics are sufficient.

(*b*) I have no suggestion to make except that care should be taken to collect only accurate information. Persons employed to collect information very often, owing to pressure of work, invent it.

Khan Bahadur Shah Nawaz Khan Bhutto.

Oral Evidence.

59133. *The Chairman:* Khan Bahadur Shah Nawaz Khan Bhutto, I think you are a large zamindar in the Larkana district?—Yes, I have lands in Larkana.

59134. Would you be good enough to tell the Commission the extent of your holding of land?—About 10,000 acres.

59135. How is that cultivated: by your tenants?—Yes, by tenants: whom we term *haris*.

59136. What are the arrangements between yourself and your tenants?—Half-and-half.

59137. On the *batai* system?—Yes.

59138. That is universal over the whole of your estate?—Yes, except on lift lands.

59139. How about the lift lands?—The *hari* takes three parts and the zamindar two parts out of five parts.

59140. Do you attach importance to the prosecution of agricultural research in Sind, and particularly in connection with the irrigation to come from the new barrage?—I would welcome it very much. The first difficulty we find so far as this Province is concerned is the poverty of agriculturists; even if research and useful suggestions are made, I do not think they will be able to carry them out unless the state of the people is improved. The root difficulty is the poverty of the agriculturists.

59141. In connection with that, I see you make the suggestion at one part of your note that agriculture in Sind does not pay?—It is the least paying industry.

59142. Do you mean that, from a zamindar's point of view, it is the least paying industry?—I think from the zamindar's point of view as well as from the point of view of the *hari*. The average area that a *hari* can cultivate under the circumstances at present existing in this Province is, at the most, about six acres of rice land; he cannot expect to get more than about Rs. 20 per acre. With four members of his family: his wife looking after his house, preparing the food and carrying the food to the fields, his boy looking after his cattle and with a daughter to help him, with all that help, he cannot make more than about Rs. 20 per acre, say Rs. 120 for his income all the year round, with four people dependent on him.

59143. Naturally, if he could obtain the land at a lower rent, by that amount he would be better off. Does the half-and-half system, as between zamindar and *hari*, appeal to you as a fair arrangement?—It is very fair, when we consider that the income of the *khatedar* possessing about fifty acres of the best land would be about Rs. 1,000. He must support his own family and keep oper door to guests; he may have to feed many other persons and there are all sorts of expenses; he has to maintain a horse to go about.

59144. Do you grow firewood on your estates?—No.

59145. Have you any plantations of trees?—We have had, but not many.

59146. Were they an advantage to you?—Not very much.

59147. Is there a shortage of firewood in your district?—We have forests round about.

59148. And that provides you with all you want?—And we have lands near the Indus, where firewood is available.

59149. Again, you suggest that the agriculturist in Sind is in fact fully occupied throughout the year; there is no period during which he is unable to employ his time fully on his land; is that so?—He has got some little time left to him; Mr. Gandhi has suggested the hand-loom and spinning; I think that might be encouraged because that will provide him with his own cloth.

59150. Have you examined the economics of hand spinning?—I do not know how it compares with other industries.

59151. You have not gone into that very closely?—It will not pay, but in the little time that is left at the *haris'* disposal they may be able to turn out sufficient cloth for themselves.

59152. But is there land on your own estates on which one crop only is raised?—Mostly two crops if we have a good season.

59153. On the one-crop land, I suppose a cultivator does have a great deal of spare time in a year, does he not?—Yes, but then during winter he will have to go about plying bullock carts on hire and doing clearance of *karias* and canals and that keeps him engaged for three or four months.

59154. How do you suggest that agriculture might be made more paying? Reading your answer to our Question 1, it would rather appear that you are not in favour of further expenditure on agricultural research but that, on the other hand, you are in favour of improving the quality of agriculture and so of making it a more paying proposition. Have you any plans in your mind?—I am not against research, but I say that first agriculture should be made paying and then research will be quite useful: they will then be able to carry out suggestions for improved methods.

59155. I think, if I may say so, in saying that, you are inclining to put the cart before the camel; surely if you want agriculture to pay, it is the research, if it works out as we hope it may, that will make it pay?—For instance, we are told that as compared with Sind, Punjab agriculture is more paying; that I attribute mostly to the inadequacy of water in Sind and perhaps to the fact that there is, here, so much burden on the land. If the latter could be removed and people devoted more time, perhaps it might be more paying.

59156. On page 66 of your note you suggest that throughout Sind, in your opinion, " classes should be attached to all schools where education in agriculture should be compulsorily imparted to students." Are you thinking there of the primary schools as well?—Yes, we have got primary schools.

59157. Do you think it a good plan to try and teach small boys how to farm? Do not you think they are better employed acquiring literacy at that age?—I think if they are expected to stick to their own profession they ought to be taught something about it.

59158. You are not much concerned with the importance of literacy; is that the point?—No, I suggest the classes should be attached to primary schools.

59159. But you agree that the prime purpose of a primary school is to make the children, who go to it, able to read and write?—Yes, of course.

59160. In answer to Question 2 (*xi*) " Are three recent movements for improving the technical knowledge of students who have studied agriculture?" You say: " Absolutely none, which is the most modest expression that I can use. Huge humbug is so much resorted to, but with absolutely no result." What exactly is the huge humbug?—There are no movements at all; but I do not think this latter remark of mine is justified.

59161. In answer to Question 3 (*b*): " Can you make suggestions for increasing the effectiveness of field demonstrations?", you ask the authorities to increase the activities of the department?—Yes.

59162. What exactly do you mean by that?—If they are provided with more funds they will be able to have more shows and machines.

59163. " Improved crops, better crops:" do you mean better varieties of crops as well?—All the measures that are suggested.

59164. " Better implements and tools:" do you not think that, before that is possible, research is very often necessary?—You may have research by all means but most of the implements have already been found useful.

59165. Then a little later on, on page 67 of your note, in answer to Question 3 (d), you say you do not know whether any striking instance of a failure or a great success has yet occurred. How about the introduction of the Egyptian plough and Pusa wheats; do you know anything about the Pusa wheats?—The implements have already been found useful to a very great extent.

59166. So that has been a success? There is nothing like encouraging people a little, you know, when they have done their best, provided they deserve it! I want to ask you one or two questions about co-operation in this Province. I think you are Chairman of the Central Bank?—I am Chairman of the Larkana District Co-operative Bank.

59167. Are you satisfied with the progress of co-operation in this Province? —Yes, it is doing fairly well.

59168. Do you keep in touch with individual credit societies at all?—Yes, almost all.

59169. Would you say that most of the credit societies are sound and soundly administered?—I would say that most of them are sound.

59170. Do you ever attend the meetings of the credit societies?—Yes.

59171. Are they well conducted?—I attend the Bank Directors' meeting, and when I go round in the district I do go and meet co-operators.

59172. According to your practice in these parts, who decides whether a particular applicant is or is not to receive a loan?—The directors of the bank, and we have to depend much upon the local director of the area from which the applicant comes.

59173. Do you mean the local bank directors?—We have about ten or eleven directors.

59174. And they are spread about geographically all over the area?—Yes.

59175. To what extent do the members of the primary society itself decide whether one of their number is deserving of a loan? Your primary credit societies are managed by committees, are they not?—Yes, they have got their own society.

59176. When a member of such a primary credit society desires a loan, to whom does he apply?—He applies to his own society.

59177. Who decides whether he is to have a loan or not?—That society has to decide; we do not deal with them individually.

59178. Do you advance money to societies?—We do.

59179. Then who are the borrowers whose applications are examined and decided upon by the directors of your Central Bank?—We decide only about a society as a whole; we do not consider the case of their individual members; that is for the society to do if we find that a society is quite sound and working very satisfactorily.

59180. Do you ever make advances to individuals from the Central Bank?—No, not the Co-operative Bank; they have the Zamindari Bank; we do not.

59181. Do you ever lend money from the Central Bank to any person or group of persons who are not co-operators?—No, we do not.

59182. Is there a demand for long-term money in Sind?—Yes, there is, but not very much yet.

59183. Would you expect that to come with the development of irrigation? —Yes, people would take to it, but we have to be very cautious before we advance it.

59184. What are you thinking of as long-term credit? Where do you think short-term money ends and long-term begins? How many years maximum do you regard as a short-term loan?—A short-term loan at present is what we give only for twelve months or two years, but we extend it for a year or two more if the crops are bad.

59185. What is the usual arrangement as regards long-term money?—About ten years.

59186. And there is a steady but small demand for that; is that the position?—Yes; a limit of Rs. 10,000 or Rs. 15,000 or Rs. 20,000 would be the maximum that I would rtcommend in each case.

59187. There is a certain demand for long-term money?—Yes, according to the needs of the society; the certain demands come only from those who seek to redeem mortgaged property.

59188. In answer to Question 22 (*b*) you say: " Co-operative credit societies require advances of money at much easier rates of interest, otherwise not only is their popularity at stake but failure is almost certain. Advances are made to societies at rates of interest up to eight per cent though the societies can hardly realise six per cent on their most fortunate agricultural investments." I suppose the primary societies can hardly be expected to lend money at

cheaper rates than they can obtain it at from the Central Bank?—They can afford to do so only with the help of Government.

59189. What you are asking for is a Government subsidy; is that the point?—The Government's own funds are deposited with the Imperial Bank; if they were transferred to the co-operative bank they could charge the same interest.

59190. Are you asking the Government to subsidise the co-operative movement out of the general revenues of the Presidency?—Not exactly, but as Government already deposits its huge surplus funds with the Imperial Bank, if some arrangement could be made with the Imperial Bank to transfer money at the same rate that they pay to Government, that will help to some extent to ease the situation.

59191. What do your district local boards propose to do to improve the sanitary and hygienic conditions in the villages?—We are proposing to introduce our own health officers; Government have just agreed to contribute two-thirds of the expenses.

59192. Do you think action is likely to follow this consideration?—Yes, immediately, so far as our district is concerned, it will not take long.

59193. How do the zamindars, as a whole, view the prospect of improved irrigation under the Lloyd Barrage scheme? Is it a popular scheme?—It should be popular under the circumstances. From our experience for the last two or three years, there is no other hope for the Province of Sind except the Barrage. They are anxiously awaiting its completion.

59194. For perennial irrigation?—Yes.

59195. *Sir Thomas Middleton:* The custom in your district is that the landowner takes half the produce?—Yes.

59196. What does the landowner do for that half? He pays the assessment. Does he provide anything in the way of bullocks, or implements, or other capital?—He makes advances to the *haris;* he pays the interest; he does the clearance of the *karias,* and he pays the assessment.

59197. Does the zamindar make advances to the *hari* without interest?—A Mahommadan zamindar does not take interest.

59198. The zamindar furnishes the capital for cultivation?—He borrows on interest mostly, and advances to the *haris.*

59199. You attributed poverty to the burdens on the land. Apart from the assessment, what burdens are there on the land? Are your local cesses heavy? —It is not only the local cesses; there are other expenses also which the land is expected to bear.

59200. What are these other things, apart from assessment and local cesses? —For instance, *rasai.*

59201. What is *rasai*?—When officials go about, we have to provide for all their requirements.

59202. Bullock carts?—Yes. But not only that, there is also *lapo;* the official who makes revenue collections from the zamindars receives one to two annas per *jireb* (half an acre). Then there is so much corruption. All these burdens are to be borne by the land.

59203. Can you give us an estimate of these in money? What do they amount to? What is the assessment on your land?—It is about Rs. 6-10-0.

59204. How much do these additional burdens add to your expenditure?—They cost a good bit.

59205. Will they add a rupee or eight annas per acre?—Much more than that.

59206. What are the cattle in your district? What is their condition? Are they of a big strong breed, or are they weak?—They are a bit weak.

59207. Have you any bulls supplied by the Government?—The local board does that. Government also bears half of the cost.

59208. Is there more than one bull stationed on your estate?—So far, we have got only three for the whole of the district.

59209. What is the breed of the bull that is sent to you?—I think it is the *Nadi* bull; that is a most popular breed in this part of the country. It can stand the climate.

59210. Do the local board make any stipulation as to the number of cows that have to be served by the bull?—Yes, they do keep registers. The man who is provided with a bull is expected to keep a regular register.

59211. Does the man who keeps a bull get a grant from the local board?—He gets four rupees a month, and after three years the bull belongs to him.

59212. You were rather severe on the Meteorological Office in your evidence. I do not think that Sind gives much opportunity for forecasts?—Whatever it is, that is the fact. If you provide information to all the local papers, perhaps your object will be served. Very few can read the Government Gazette or the English papers here.

59213. The only item in the forecast that would interest you would be the rainfall?—Yes.

59214. There is not much to forecast in Sind?—But then we are interested in the rainfall in the Punjab and the Himalaya side.

59215. You want to know how much water is coming into the Indus?—Yes.

59216. You informed the Chairman that, on the whole, you regarded this new scheme, the Lloyd Barrage, as likely to be of great benefit to Sind. But in your evidence you say that people have many misgivings about the success of this huge propect. You say "I have had to consent to its being undertaken after a very great struggle in my mind." What are your doubts?—We have no doubts so far as the Barrage itself is concerned, but we had some doubts so far as the details were concerned. I refer to the excavation of canals and such other questions.

59217. The alignment of the canal?—Perhaps; the public was of opinion that instead of having all these huge canals and acquiring land and paying heavy compensation, if a feeder was taken to feed the existing canals on the right bank, that would help a great deal and save the expenses. But the experts were of opinion that it was of no use. So, we had to give way to the opinion of experts.

59218. They have made careful surveys. Are they not likely to know better than those who have not examined the question at all?—They being experts, we had to accept their decision.

59219. *Sir Chunilal Mehta:* In your remarks about research and the answers you gave to the Chairman, I suppose you mean that research ought to be conducted with a view to local conditions. You mean it should be done in a manner which would bring out schemes which the cultivator can afford?—What I mean is that there may be risks, but at the same time you should find out how to improve the prosperity of the agriculturist, so that he may be able to effect those improvements or carry out your suggestions. Otherwise, it will be of no use.

59220. You have perhaps had some instances where methods were recommended which were beyond the means of the ordinary cultivator?—Yes.

59221. That has rather made you sceptical about certain improvements?—Yes.

59222. On page 68, you speak about the ill effects of sub-division, especially according to Mahommadan law. Of course, it is very gratifying to hear that you recommend that some legal steps should be taken and that Government should take them?—I for one would welcome it, but it is a very difficult question. Unless the community itself comes forward, I do not see how Government can interfere.

59223. I quite agree with you that Government cannot interfere with the law of inheritance, whether it is Mahommedan or Hindu law. But you go on to say that fragmentation beyond a certain limit should be totally restricted by some legal enactment?—Yes.

59224. This would be necessary, and Government should do it?—Yes, even in Government's own interest. To that statement of course I stand. I am not talking now of the law of inheritance. I see that it is causing a good deal of harm and this is one way of dealing with it.

59225. I am not clear about your answer to Question 22 (*c*). Are you referring there to schemes of consolidation?—We have not had any experience except of agricultural societies at present.

59226. Quite so. The question was whether minorities should be coerced. That is to say, supposing there were 100 men in a village and 75 or 66 per cent of them desire to have a redistribution and consolidation scheme and the rest simply stood out, some of them through pure obstinacy, would you in such a case recommend that there should be legislation to compel the minority to come in?—Yes; on principle it is very necessary, but you ought to have the consent of a large majority, at least 75 per cent or 80 per cent.

59227. *The Raja of Parlakimedi:* You were talking about the *haris*. Have they no sort of occupancy right over the land which they cultivate?—There is only one class called the permanent *haris* who have got the right, not the rest of the *haris* who are tenants-at-will.

59228. Suppose a landlord engages them for a couple of years, for that period do they not have any occupancy right?—It is very seldom that landlords turn them out. They continue there for years and years. Some have been on the land for generations, but they have not got any legal right.

59229. While engaging them, what is the understanding between the zamindar and the *hari*?—The zamindar will have to make advances to the *hari*, provide him with loans and seedlings, have the *karias* cleared, and the *hari* will do the cultivation. The zamindar will have to provide him with all the facilities. The produce is shared in the proportion of half and half; the labour will be the *hari's*.

59230. Is fifty per cent collection effected on all crops grown?—It is done in all the districts except lift land.

59231. Irrespective of the labour which each crop entails?—Yes. So far as I know, it is done positively in three districts. I do not know whether it is the same in other districts, but I think it is fifty per cent all over, except for lift land which involves more labour.

59232. How often do you have settlements?—Every twenty years.

59233. If the zamindar applies for a resettlement, the land should be surveyed first?—All the land is already surveyed. The settlement is done by Government of their own accord, as soon as the time expires.

59234. Is there any provision in the Act to enhance the zamindar's rent periodically, say once in twenty years, when the resettlement takes place, in consideration of the rise of prices?—Yes, they do revise. In most of the cases, the assessment is enhanced, and in a very few cases it is reduced.

59235. What are the factors generally taken into consideration when an enhancement is sanctioned?—That ought to be known to a Settlement Officer. Their anxiety always appears to be to enhance the assessment. What factors they really take into consideration, I do not know.

59236. In your parts you get your share of the produce in kind, not in cash?—Nothing in cash.

59237. In the waterlogged areas that you mention on page 65 of your note, is it not possible to grow even paddy?—They sometimes have rice cultivation where waterlogging has not completed its ruin; in the 'lar' portion they do not do transplantation, but broadcast the seed. They try transplantation at some places and broadcast in others but the crops do not come up so well.

59238. Do you possess any of that kind of land?—No.

59239. Why has there not been any attempt to drain that sort of land up to now? Is it not possible to drain it?—Possibly; the Deputy Director of Agriculture will be able to answer that question.

59240. You have no knowledge of it?—I do not know. There is no system of drainage or anything of the kind so far.

59241. You do not approve of research work on veterinary diseases?—Perhaps I have not expressed myself properly; I do not oppose it.

59242. Do you not have any animal diseases in epidemic form in your parts?—There are, and they are attended to. In my own district, there are three or four veterinary dispensaries.

59243. Unless they carry on research work on these epidemics, how can you give effective treatment?—It is absolutely necessary.

59244. What are the most prevalent diseases among cattle in Sind?—I cannot say.

59245. You have no knowledge of them?—I know some, but I think you will have an expert to reply to that question.

59246. *Mr. Kamat:* As a zamindar, will you tell me from your experience how much income a man can get per acre from rice in Sind?—It depends on the kind of land and the facilities for water.

59247. What will it be roughly?—The average for a small area can safely be taken at about forty rupees per acre, twenty rupees to the zamindar and twenty to the *hari*. That is for an area of about fifty acres.

59248. Similarly, what would be the income for cotton?—I cannot give you the figure for cotton.

59249. What are your other crops?—*Juar*, gram and wheat.

59250. How much can you get from *juar*?—At the most, one can get about twenty rupees.

59251. Is it twenty rupees as a half share, or on the whole?—On the whole; sometimes it is even less.

59252. Out of this, the zamindar pays land revenue assessment?—Yes.

59253. In answer to very many of our questions the burden of your reply has been, rather than do various things such as applying the Usurious Loans Act, restricting or contracting the credit of cultivators or limiting the right of mortgage or sale, etc., the burdens on the land should be reduced, and by burdens " you have explained that you mean assessments and perquisites?—Yes.

59254. Have you any idea of the pitch of assessment per acre of rice land in your part of the country?—I have stated that it is Rs. 6-10.

59255. Now, if Rs. 6-10 per acre is the assessment and if Rs. 40 is the income you derive, do you think all the ills to which the agriculturists are subject could be done away with by merely reducing this burden?—The zamindar has to pay about Rs. 6-10 as assessment. Then it costs about Rs. 2 per acre for clearance.

59256. Even assuming that this amount of Rs. 6-10 were remitted by Government and the land were given to you free of assessment, do you think all the indebtedness in Sind would be removed?—I blame the system of administration. What I feel is that since the Collector's administration has become weak our expenses have increased, and so have the burdens on the land.

59257. Do you mean that there are other burdens?—There are other burdens. Formerly the Collector was considered the head of the district and the Police, the Public Works Department, the Forest Department, were under his control, and things were not so bad for the agriculturists as they are now.

59258. On page 5 of the Government memorandum dealing with Sind, we are told that the average assessment per acre in Sind is Re. 1-8 per acre?—Because most of the land is lift land, and on lift land the assessment is low. that is why they have worked out such a low average.

59259. Would this apply to the class of land from which you derive an income of forty rupees per acre?—No; that is the best land.

59260. About *rasai* and *lapo*, I think there was a committee appointed some years ago?—Yes. And there have been circulars and Government orders from time to time.

59261. Do you mean that the nuisance has not been removed?—It has not been removed. It continues as fresh as ever.

59262. Did you serve on that committee?—No.

59263. But it was a people's committee?—It was a committee of officials and non-officials.

59264. You have stated that the district local boards are at fault with reference to the state of the roads?—I blame the Government, not the district local boards. There are very few provincial roads in this Province.

59265. On page 67 of your note, you say "Our chief lack, in Sind, is roads." By "our" whom do you mean?—There are no roads worth mentioning which are kept up by Government. If you will read the whole of my paragraph, you will find that I have thrown enough light on it.

59266. Yes, I am just going to ask you some questions about it, but I should first like to get some light on the word "our." What exactly had you in mind?—Not the district local boards as much as the Government.

59267. You know, of course, the value of good roads to the agriculturist as they secure better prices for his produce. I suppose you agree with that?—Yes.

59268. Have the representatives of the cultivators, either on the district local boards or in the Council, ever met the cultivators face to face and explained to them that if they had good roads they would get so much per cart or per acre more for their produce? Have they explained the position to the cultivators?—The necessity is acknowledged there.

59269. Have they asked their opinion or their mandate, as the representatives of the cultivators either on the district local boards or the Council, whether they should support a road cess or a road tax for the benefit of the cultivators? Have you taken that trouble?—We have actually introduced toll taxes.

59270. But a toll tax does not cover the purpose of road improvement?—We are doing our part.

59271. Have you explained the position to them and obtained their consent?—There is no universal consent; there would be some opposition as well. The majority of them realise the necessity, and they are prepared to bear the burden.

59272. You have not fortified yourself by ascertaining their express desire in this matter, whether they would agree to a tax or whether they would oppose it?—I have noticed that I have to face all the agitation so far as my district is concerned.

59273. In favour or against?—Both in favour and against.

59274. You have in this case fortified yourself by obtaining their opinion and their consent?—Yes. As president of the district local board, I first introduced it in my district.

59275. What prevents you from further explaining the policy, and getting the road tax enhanced through the district local boards?—It will not be possible for district local boards, unless Government come forward to take up some of the important roads and provincialise them.

59276. Have you voiced the feeling that provincial revenues should come to the aid of the district local boards?—Yes.

59277. And, besides that, you are for an additional road cess?—Of course.

59278. In answer to Question 20 (*c*), relating to steps to be taken to improve the quality, purity, grading, etc. of agricultural produce, you say: "Please do not interfere with the people who are doing all that is needed in the matter." Can you explain what is being done by the people for improving the quality and purity of agricultural produce?—They have done much; at least they are very anxious to secure the best seeds wherever they can be got and improve the quality as much as possible.

59279. You say that the cultivators have no time to take to subsidiary industries. Why?—Because much of the agricultural labour has been drawn to the neighbouring factories and mills, and there is scarcity of labour for agriculture.

59280. Then, Sind requires no subsidiary industries?—We do.

59281. *Mr. Jamshed Mehta:* Supposing *rasai* and *lapo* are refused what will be the consequence?—At present only the zamindar who gives *rasai* and *lapo* is considered useful, and the criterion of usefulness is not based on improvement of cultivation or increase of holdings by thrift. I think *rasai* and *lapo* should be discouraged to a very great extent. If a zamindar who is found to mortgage his property or to sell his land or get into debt, is not encouraged by the officials, perhaps he will know where he stands and he will not incur unnecessary expenditure.

59282. Half of the produce is given to the *hari* and half to the zamindar; out of whose share comes the *rasai* and the *lapo*?—From the zamindar's.

59283. Therefore, the *hari* is not affected by *rasai*?—Except that he has to contribute to the labour.

59284. One of the witnesses said that it is the recognised hospitality of the zamindar. Is that willing or forced?—I would admit that the zamindar is known for his hospitality. Of course you can accept hospitality from a well-to-do man. You ought to consider twice before you accept hospitality from a man who has gone under the Encumbered Estate Act and who has mortgaged his property. Only hospitality from well-to-do people ought to be accepted.

59285. One of the methods you have suggested for lessening the burden of debt is that co-operative societies should be able to lend money to members at a lower rate of interest, and you also suggest that Government should deposit money with the co-operative central banks just as they do with the Imperial Bank of India. Do you mean that then the central banks would be able to lend money to the co-operative societies at a lower rate of interest?—Yes.

59286. It has been suggested that pumps may be erected to lift water for irrigation. Do you think it could be done by co-operative societies?—Who will bear the cost?

59287. Supposing money is lent to them by the central banks, and half the cost is met by share capital of the societies, do you think that co-operation can be made use of in that way?—Yes, if they get money at a lower rate of interest and permission to pay back the loan by instalments.

59288. Government are at present purchasing grass for the Military Department from contractors. Do you think they could purchase such grass from co-operative societies? The societies might then be able to pocket the profit?—Yes; they could make money.

59289. You speak about the proverty of Sind, and you say that agriculture does not pay. Is that because of the relationship between the zamindar and the *hari* or between the zamindar and the Government? What party is particularly to blame?—Deficiency of water is the first cause. Even where we get water, the duty is too low. The duty is fixed at 35 to 40 acres per cusec, when 25 acres only can be irrigated by that amount. Then I have pointed out the other burdens and expenses.

59290. You say that it would be better to transfer the forests to the local boards. Is that because you think that there is some disadvantage in Government managing them, or is it because you want the district local boards to make money?—Not because I want the district local boards to make money, but because the district local boards would give more facilities to the public for grazing, etc.

59291. You make a statement that the Sind zamindar is generally in debt and he would welcome long-term loans either from co-operative societies or from Government. What is the period for which such loans should be given?—Ten years. In ten years they do not get more than four good seasons.

59292. Is it your opinion that such a thing is desirable? One of the witnesses made a statement that money is borrowed for lavish marriage expenses and other extravagances. Supposing you place at their disposal long-term loans either through the co-operative societies or direct from Government, would it not be misused? What is your opinion?—It is the officials who say that people are extravagant and spend lavishly; the facts are to the contrary.

59293. You say that there is no scarcity of fodder in Sind; are you talking of your own district, or of Sind generally?—I understand that in some parts there is little fodder grown, but they can be supplied by the other places. Owing to the river Indus we have got grass in one part or other of every district, except Thar Parkar, a desert division which is out of the reach of the Indus and depends on rain.

59294. In your district, you feel that the labour difficulty will be felt after the Barrage is completed. Mr. Dow seems to think otherwise. What is your considered opinion?—At present, as I have said, we are losing labour because agriculture is not paying owing to inadequate water supply, and labourers going to other industries. Perhaps when water is given under the Barrage scheme, all the labour may return to the land.

59295. In your statement you have expressed your apprehension about Lower Sind after the Barrage is completed. Mr. Harrison told us this morning that there was a report of Mr. Shoubridge and according to that report five lakhs or eight lakhs have been provided for the improvement of the Fuleli. Have you studied that report, and do you think that the amount provided is sufficient?—At the time the Barrage question was before the Council I had not read it. But I had a discussion with Mr. Shoubridge; we had a conference of the Lower Sind zamindars, and we had to convince the officials of our apprehensions. The Public Works Department may say what they like, but I feel that our apprehensions are real. Even now we see the effect of the Barrage system; since the Sutlej project has affected our supplies in the Indus in Sind, how cannot the Barrage at Sukkur affect supplies in Lower Sind.

59296. On page 69 of your statement you say: "In most places detailed distribution is left to landholders who break each other's heads and in some places where distribution is done by Government officials it is a source of annoyance and mischief and leaves so much authority in the hands of subordinate officials whom nobody can expect to exercise it honestly. In my opinion the detailed distribution should be left to the landholders." Will you explain this statement? In one place you are afraid of landholders breaking on another's heads, but in another place you say detailed distribution should be left to the landholders?—In the interest of fair distribution, we should have a committe presided over by the Collector, and consisting of members drawn from the local zamindars, chosen from the head, middle and tail portions of the canals and also the Executive Engineer as a member. A committee will be able to ensure fair distribution if adequate water is provided in the canal.

59297. You complain, at the same page, that you are far from the seat of Government. May I take it that you want Sind to have its own Government?—I do.

59298. Would you like to have the Fragmented Holdings Bill extended to Sind?—I have not opposed it in the Council.

59299. At page 67 you say that fifteen per cent of the *taccavi* filters away; could you tell us how it filters away?—I think it is an open secret and known to almost everybody; even Government officials will not contradict it.

59300. You speak of the "Damocles' sword of Government" hanging over the head of the borrower. Can you explain that?—Yes; at the time of repayment, if he fails to repay on account of crop failure, all sorts of hardships are imposed on him.

59301. At the same page you say that tractors and threshing machines should be lent on hire by Government. Would you advise the formation of co-operative societies to rent them out to zamindars?—I would advise that method. The Agricultural Department have introduced certain implements, but the results they claim for them are not justified by experience. I say, therefore, that Government shoud buy the machines and rent them to the people and convince them of their success. They should have no objection to doing so if the results claimed are true.

59302. As regards meteorological information and propaganda, would you advocate the use of vernaculars?—Vernacular papers should be given all this information, so that people may know exactly what happens.

(The witness withdrew).

Khan Bahadur Shah Nawaz Khan Bhutto.

Mr. J. H. G. JERROM, Superintendent, Civil Veterinary Department, Sind and Rajputana, Karachi.

Replies to the Questionnaire.

QUESTION 15.—VETERINARY.—(*a*) The Civil Veterinary Department should be independent.

(*b*) (*i*) All existing veterinary dispensaries are under the control of the district local boards. This system is not satisfactory.

(*ii*) No; for want of funds, Sind, with a cattle population of 1,813,957, and an area of 46,507 sq. miles, is served by only eighteen dispensaries. More dispensaries are very necessary.

(*iii*) Yes.

(*c*) (*i*) No; but there are signs that agriculturists are beginning to realise the benefits of veterinary science. Propaganda work by Veterinary Inspectors, touring Veterinary Assistance Surgeons and the local authorities are the only means of remedying this.

(*ii*) There are no touring dispensaries. Last year, a scheme for the employment of itinerating Veterinary Assistant Surgeons was submitted, but owing to lack of funds the proposal was not sanctioned.

(*d*) The chief obstacles are:—

1. Ignorance of the people.
2. Failure of local authorities in promptly reporting outbreaks of contagious disease.
3. Objections of the people to having their animals either inoculated with preventive serum or, in outbreaks of glanders or surra, to having the animals destroyed. In this respect there has been a considerable improvement during the last two years.
4. The influx of cattle (disease-carriers) for grazing, from Indian States, none of which have any organisation for dealing with contagious diseases. Legislation would certainly be of immense value in controlling outbreaks of contagious disease but would be very expensive and, at present, owing to the ignorance of the majority of owners of animals, very difficult to enforce. More dispensaries and systematic touring of Veterinary Assistant Surgeons will improve existing conditions and enable the people to appreciate the benefits which the Veterinary Department can give them.

(*e*) There is no difficulty in obtaining sufficient serum.

(*f*) There are at present no obstacles in the way of popularising preventive inoculation as no fees are charged. Some years back, preventive inoculation was not popular with the owners of cattle but having seen the good results obtained, they now, in many cases, ask for their animals to be inoculated during outbreaks of rinderpest and hæmorrhagic septicæmia.

(*g*) Yes.

(*i*) I would advocate the extension of the Muktesar Institute.

(*ii*) Provincial veterinary research institutes working in conjunction with the Muktesar Institute might be started in the large Provinces.

(*h*) I would recommend that special investigation should be conducted by officers of the Muktesar Institute in the smaller Provinces, and in the larger Provinces by their own officers.

(*i*) Yes. The whole service would then be co-ordinated under one head. The Superior Veterinary Officer could outline a policy for the whole of India.

Oral Evidence.

59303. *The Chairman:* Mr. Jerrom, you are in charge of the Civil Veterinary Department?—Yes.

59304. What is the principal cattle disease in Sind?—Rinderpest.

59305. Are you using the method known as serum-simultaneous inoculation?—We are only using the serum-alone method; we have not used serum-simultaneous. It is rather risky, and I have had no experience personally.

59306. You no doubt take an interest in the improvement of cattle?—When I first came to Sind cattle breeding was in charge of my department, but we have now handed it over to the Agricultural Department.

59307. What is the policy; to aim at the improvement of cattle as draught animal, or as milkers, or as dual purpose animals?—I was hardly in charge long enough. As regards the Karachi cattle they are purely milch cattle.

59308. Is there any non-Indian blood in that cattle?—None; it is pure Indian.

59309. Then, in your campaign for improving cattle in Sind, have you attempted to popularize castration?—It had not been very popular up to last year when we introduced the Burdizzo method of castration. Since then the numbers have gone up.

59310. You have no difficulty in obtaining sufficient serum and no complaint to make about the quality?—No.

59311. *Sir James MacKenna:* What is your relation to the Bombay Department?—We are under the Bombay Government.

59312. Are you under the principal veterinary officer in the Presidency or under the Director of Agriculture?—I am directly under the Government through the Commissioner in Sind. Practically, I am in the same position as the Superintendent, Veterinary Department for Bombay; I deal directly with the Government through the Commissioner in Sind.

59313. You have no relation at all with the Bombay side, except with the Government through the Commissioner?—No.

59314 When were you recruited?—I came to Karachi in 1921.

59315. Are you from the Royal College?—Yes. I qualified in 1907.

59316. *Professor Gangulee:* We are told that cattle-breeding is not a paying proposition in the Bombay Presidency; do you subscribe to that view?—I have no experience of the Bombay Presidency. As regards this Province (Sind) there is extensive breeding of cattle in Karachi district; the Karachi cattle are well known.

59317. Is it due to the export trade in cattle?—There is a big export trade in Karachi cattle; they are known in many places.

59318. Specially in Argentina?—They are exported to Java, Formosa and Ceylon.

59319. Having that export trade, you can say that cattle-breeding might be a paying proposition?—Yes.

59320. Is the demand for your Bhagnari cattle or for dual purpose animals?—I do not think there is any export trade in Bhagnari cattle. The export demand is mostly in Karachi cattle, which are milch cattle.

59321. Is the value of these cattle based on the milk yield?—Mostly on the milk yield; especially those cattle that go to Ceylon, they are all for milking purposes.

59322. Do you hold out any prospect for buffalo breeding?—I have had no experience of buffalo breeding; my experience of cattle breeding was only for nineteen months.

59323. You say that the present system of having veterinary dispensaries under the district local boards is not satisfactory. Have you any definite reason for that view?—It is a system of dual control; the Veterinary Surgeon in charge of dispensaries is provided by Government who pay his

salary and travelling allowance, but the other expenditure is controlled by the local board.

59324. You think that this dual control will not work?—I want either Government control or local board control.

59325. You say that some years ago preventive inoculation was not popular, but having seen the good results they now in many cases ask for inoculation; you think the prejudice is not impregnable?—Propaganda and opening of more dispensaries will gradually make the people realise the benefits to be derived from inoculation.

59326. You consider that legislation would be of immense value in checking animal diseases?—Undoubtedly.

59327. But you are afraid of the unwieldy machinery that may be necessary?—I think the expense and the number of veterinary police required would be tremendous. I do not think, in the present stage, it would be possible. Near Sind we have several Indian States where there is no legislation; and I do not suppose there would be any advantage in enforcing legislation in Sind, unless the States also were brought under the same legislation. During the last few years we have traced several outbreaks of rinderpest and foot-and-mouth disease to cattle brought in from adjoining Indian States.

59328. *Mr. Jamshed Mehta:* What is your actual relationship with the Agricultural Department? How do you come in touch with them?—If the Agricultural Department wants us to do anything we always give them whatever help we can; but we have got no actual relationship with the Agricultural Department.

59329. A suggestion has been made that your department should be brought under the Minister of Agriculture; what is your opinion?—I am inclined to agree with that, but ours is a technical department and it should be under a veterinary officer.

59330. In paragraph 3 (*d*) (2) of your note, you complain of the failure of local authorities in promptly reporting diseases; what do you mean by local authorities?—The reporting of contagious disease is done by *tapedars*, but in actual practice these men have so much other work to do that they do not bother about reporting diseases. Although it has improved during the last three or four years, it still leaves much to be desired.

59331. Do you go outside Sind?—I go to Rajputana also.

59332. What staff have you got?—For Sind we have two Inspectors and twenty-one Assistant Surgeons. That is all the staff. For Rajputana, it is practically unorganised; there are only two dispensaries, one of which is in charge of a local board and the other in charge of a municipality.

59333. Do you attend to cattle disease only when you are called upon; or do you attend to it on your own initiative?—The Veterinary Surgeons in charge of dispensaries go on tour for one week in a month. They are not doing it just now, because we have not sufficient budget allotment. When they do tour they enquire in the villages about cattle diseases, and if there are any they attend to them.

59334. Your staff is insufficient?—Yes.

59335. Would you like it to be added to ?—Yes; the ideal would be one Veterinary Surgeon in charge of each taluka.

59336. *Sir Thomas Middleton:* What are the usual diseases you treat in your eighteen dispensaries?—The great majority of them are wound cases of various kinds; it is the chief thing one sees in camels and bullocks.

59337. What is the usual class of animal?—Usually bullocks; then camels.

59338. Do you get surra?—It is always with us; we have a few cases each year. Last year we had about ten cases in camels.

59339. You said you had two Inspectors and twenty-one Assistants. There are eighteen dispensaries. What about the other three Assistants?—

The three are kept in reserve. One I keep in Karachi where there is a very big dispensary.

59340. The whole of your staff is engaged for dispensary work, except the two Inspectors?—I have two reserve men who help in dealing with contagious diseases.

59341. Are there any dispensaries in which you ought to have a couple of men?—Karachi is the only one big enough to employ two Veterinary Assistants; most of the dispensaries have compounders in addition to the veterinary assistant surgeons.

59342. How do you recruit these Assistants: where do they come from?—They are all except one, Sindhis; they are given scholarships to the Bombay Veterinary College by Government; we are allowed six scholarships for Sind scholars; at present we have five men studying there.

59343. You have none from the Punjab College?—We have got one man who was recruited some ten or fifteen years ago.

59344. What do you pay them on appointment?—They start at Rs. 75, going up to Rs. 155. The two Inspectors start at Rs. 175 and go up to Rs. 225.

59345. You say that in a country like Sind you want twice as many?—Many more; the dispensaries are much too scattered.

59346. Supposing there were to be a large increase, do you think you would get men enough coming forward at the salaries now offered?—I think so; of course we could not get all Bombay graduates because they are at present all employed, either in Bombay or in Sind.

59347. You would have to train Sindhis?—I do not think, it would be absolutely necessary to train Sindhis, although the Sindhi is certainly more popular than an outsider amongst the people.

59348. You have come across no difficulties in the way of recruitment?—No, not up to now.

59349. What is the usual age of castration of the working bullocks?—From six months up to two years; we castrate them up to two years. The Italian methods that we are trying now we have found in practice to be not very successful with animals over two years old; we have some difficulty in crushing the cord. We have had a few cases where Veterinary Assistants have castrated old bulls but it has not been at all successful, so that we now limit our work to young cattle.

59350. Are there any districts in Sind where you have as big a class of working bullocks as you have in Rajputana?—I do not think so.

59351. Can you tell me whether these Rajputana cattle are castrated under two or three years old?—It is done by native quacks there.

59352. But do you happen to know the usual age?—No. I have very little experience of that; they are older, I believe.

(The witness withdrew.)

The Commission then adjourned till Tuesday, the 25th October, 1927.

Tuesday, October 25th, 1927.

KARACHI.

PRESENT:

The MARQUESS OF LINLITHGOW, D.L., (*Chairman*).

Sir THOMAS MIDDLETON, K.B.E., C.B.

Sir JAMES MACKENNA, Kt., C.I.E., I.C.S.

Mr. H. CALVERT, C.I.E., I.C.S.

Raja Sri KRISHNA CHANDRA GAJAPATI NARAYANA DEO of Parlakimedi.

Professor N. GANGULEE.

Dr. L. K. HYDER.

Mr. B. S. KAMAT.

The Hon'ble Sir CHUNILAL V. MEHTA, Kt.
Mr. JAMSHED N. R. MEHTA. } (*Co-opted Members*).

Mr. J. A. MADAN, I.C.S.
Mr. F. W. H. SMITH. } (*Joint Secretaries.*)

Mr. A. A. MUSTO, C.I.E., M.Inst.C.E., Superintending Engineer, Lloyd Barrage Circle, Karachi.

Replies to the Questionnaire.

QUESTION 1.—RESEARCH.—I suggest the necessity of establishing and maintaining experimental stations at several points in the Barrage area for investigating particularly the reclamation of *kallar* lands, duties of water for various crops, prevention of waterlogging, efficient drainage methods, and suitable rotations of crops.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—If possible, crop experiments should be conducted on the lands of cultivators, with their normal water supply. Cultivators are sceptical of results obtained at Government farms, as they suspect that heavy waterings are given and that the statistics of manuring etc., are understated.

QUESTION 4.—ADMINISTRATION.—Road and rail facilities should be greatly extended and improved in Sind to enable easy marketing and export of crops.

QUESTION 5.—FINANCE.—Seed might be issued free of cost and value recovered from the crop till good strains are established. Seed depots might be wholly or partially financed by Government and administered either by co-operative societies or by Government.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—Please see Question 22 (*b*) (*i*).

QUESTION 7.—FRAGMENTATION OF HOLDINGS.—When a holding has reached the economic limit of size, would it be possible to legislate that when, by the death of the owner, it is liable to fragmentation, the State should purchase it at an official valuation, or at the price fetched by its sale at auction, whichever be greater, the condition of sale to be that the holding

is not to be reduced by part sale or future fragmentation? Any of the descendants of the late owner should have the option of retaining the holding unbroken, or could bid for it in auction. This may be difficult to arrange but might offer a solution to the serious danger of fragmentation.

QUESTION 8.—IRRIGATION.—(*a*) (*i*) 1. I would suggest the early investigation of the possibilities of a barrage on the Indus at the extreme north of Sind to regulate the supply to lands north of Sukkur and Rohri. Close contouring of the country should be done at once wherever not already done.

2. Similarly, the possibilities of a barrage in the neighbourhood of Kotri to supply the lands between that town and the sea on both banks should be investigated. It appears at first sight that the latter scheme would be difficult to make remunerative owing to the limited area to be served and the poorness of much of the land, which is largely devoted to rice cultivation. The scheme has already been mooted many years ago. (*Vide* the Eastern and Western Delta Canal projects.)

3. I would suggest the early starting of rainfall recording stations in the Baluchistan mountains to the west and north-west of Sind, an investigation of the run-off available, and of suitable sites for storage reservoirs in these hills. Such reservoirs might be made to supply canals for feeding the rich submontaine tracts lying between the hills and the areas commanded by the Lloyd Barrage, and the areas between the hills and any further areas which can be commanded by other future canals from the Indus in connection with the possible barrages suggested in 1 and 2 above.

Such schemes for storage reservoirs are not likely to be needed for a good many years to come, but would undoubtedly become practical politics when the Barrage areas are fully developed. At present we have absolutely no information about the rainfall in this vast mountainous region. When storage schemes become necessary it will be an irreparable misfortune if rainfall statistics have not been collected for many years in advance so that reliable estimates of run-off can be framed and projects prepared therefrom.

The only indication we now have of this rainfall and run-off is in the great floods or spates which periodically pour through the gorges in the eastern boundary of these hills and debouch over the plains. There are many such gorges in the western Nara district of which the principal is the Gaj Nai, the torrent issuing from which has been estimated to carry as much as 200,000 cusecs for several days at a time and smaller floods for much longer periods.

These floods at present bring cultivation and prosperity to the submontaine tracts such as the Johi Pat, but bring ruin to the low-lying lands commanded by the canals from the Indus. If this water could be stored and issued by regulated channels it would be a source of great wealth to the district and would save much damage to present and future river irrigated lands and to railways. It is possible that an ample water supply under pressure could be stored for supplying Karachi city and irrigating high lands in Karachi district. These possibilities are mere suggestions and can only be investigated after information as to rainfall and sites for storage works have been collected. The torrents which issue from these hills periodically and cause so much trouble and damage to railways and canals are an indication that there is heavy rainfall in the interior of these mountain ranges which might be stored and utilised.

(*b*) The existing methods of distributing canal water in Sind are entirely unsatisfactory, *i.e.*, by open *karia* heads or plain sluices usually excavated to canal bed level. This enables the *karias* in the upper reaches to take the major portion of the canal supply and makes it practically impossible to distribute the available supply equitably throughout the canal. A form of module or self-regulating outlet should be used for every outlet from the canal. There is a number of successful modules in use in the Punjab and on the Jamrao system in Sind. These should be adopted on all new canals, and wherever possible in existing inundation canals, though it is a more difficult matter to obtain completely satisfactory working of

the modules under the extreme variations of level obtaining in the old inundation canals.

I have no personal experience of the working of moduled outlets but have inspected a number, and studied the literature and statistics on the subject, and am satisfied that they are fully satisfactory.

On the other hand, I have held charge of a canal sub-division and district with nothing but the open type sluices and have seen the impossibility of making an equitable distribution with such outlets.

QUESTION 9.—SOILS.—(*a*) (*i*) I consider that all natural valley lines should be kept entirely open and given a free outlet to some main drainage line. No canal or water channel of any kind should be allowed to cross such valleys or depressions, which should become the enforced boundaries of distribution systems, and sub-systems. Unless such valleys are well defined, *i.e.*, having fairly steep sides and a well defined bottom (which they seldom have in Sind) a directing channel or drain should be excavated along their lowest line and be kept free of crops or undergrowth.

(*ii*) I believe much of the waterlogged (and therefore uncultivable, and in many cases alkali) land in Sind is due to the complete blockage of these main and sub-valley lines by canals and water courses, which not only prevent the run off of drainage, but actually form the depressions into waterlogged reservoirs which effectually block all drainage from the higher lands and raise the subsoil water level throughout the tract.

(*b*) Not from personal knowledge.

(*c*) It would be sound business to give full remission of assessment for the first year's crop, half remission for the second year and a quarter remission for the third year, after assessing ordinary remission according to the value of the crop. Some such sliding scale of preferential treatment would encourage progressive efforts at improvement of the soil and would eventually give a reclaimed area of good value to the State and the owner.

QUESTION 12.—CULTIVATION.—Where large holdings are prevalent, or even large areas in one open stretch consisting of various holdings, cultivation by steam or motor tractors should be encouraged, as this enables deep and rapid cultivation to be done and reduces the number of cattle necessary. Deeper cultivation will become more desirable as the intensity of cropping increases and as deep rooted crops are developed.

QUESTION 14.—IMPLEMENTS.—(*a*) Please see Question 12. With the great increase of cultivation which will follow the Barrage canals and the much greater outlet for manual and animal labour in attending to crops, it will undoubtedly be profitable and essential to economise such labour, wherever possible, by the substitution of machinery and more efficient implements than are now used by the cultivator. A better plough than the wooden country implement will be one of the first things necessary. It is probable that a well-made country iron plough, designed and made on the spot, will better meet requirements than European designs. It would seem advisable to encourage the opening of up-to-date workshops for making such ploughs and other implements at suitable centres throughout Sind. Chaff-cutting machines, reapers and binders, harrows, disc ploughs, winnowing machines, threshing machines, and other agricultural plant will be required and most of these could be made locally. Where the plant or capital on a holding is insufficient to provide engine power for driving the plant, an efficient bullock gear will be a desirable source of power. This could also be made locally. Cotton gins and baling presses, oil mills, etc., will be required, but private enterprise will probably meet the demand without intervention by Government.

(*b*) Apart from demonstrations by the Agricultural Department of the use of such implements and machines (and these demonstrations should be made on cultivators' land by a travelling party going from village to village with the implements), co-operative societies should be encouraged to stock and issue such implements on easy payment terms. The societies should, if necessary, be assisted financially to start by Government, but

should almost immediately become self-supporting. They might also maintain a repair depôt.

(*c*) I believe the manufacturers of agricultural implements seldom have resident representatives who are in constant touch with the people and their requirements. (This would be obviated if manufacture were started at various centres in Sind.) Hence, they design and make unsuitable implements. To alter a design, and the plant for making it, involves considerable outlay and increases the price of the implement. Hence the necessity for the maker being on the spot, studying the requirements, and getting his design right, before manufacturing. The officers of the Agricultural Department are non-technical men who do not understand the manufacture side of the matter and I believe they do not realise the difficulty and expense of altering designs of even simple implements. It would, therefore, be far better for the makers personally to study the requirements on the spot and make their own designs rather than rely on the Agricultural Department for information. Probably the greatest difficulties in the distribution for sale of such implements are the lack of reliable selling agents in the *mofussil*, and the difficulty of the cultivator in putting down cash for his purchase. Both could be overcome by co-operative sale depôts as suggested above. One such depôt should be arranged for suitable groups of villages.

QUESTION 17.—AGRICULTURAL INDUSTRIES.—(*d*) Please see reply to Question 14. Private enterprise should develop these industries if facilities are given.

(*e*) Possibly, but part-time labour is not of much use to any industrial concern, whose plant and staff need to be kept constantly employed.

(*f*) Yes. By practical experts in such industries, not by amateurs or college youths good with their pens.

(*g*) With the introduction of perennial water there will be far less idle time for the rural population. (*Vide* pages 15 to 21 Vol. VI Lloyd Barrage Canals Project, 1919-20.)

(*h*) Yes. By the encouragement of flower and vegetable gardening round their houses and a certain amount of control over buildings in villages. Elementary town planning could easily be done by local bodies, assisted, if necessary, by Government; and the building of village "slums" should be prevented. If every house were compelled to have a certain amount of land around it and horticultural shows were instituted, with prizes for the best gardens, great improvement might be effected in the health conditions and amenities of their environment. Public bodies should be encouraged to plant and maintain trees in the villages and provide public gardens and play-grounds, on however humble a scale.

QUESTION 18.—AGRICULTURAL LABOUR.—(*a*) (*i*) and (*ii*) For permanent migration selected parties of agricultural labour and zamindars from over-populated areas might be brought by free excursions and shown the under-populated areas and conditions. Advantageous conditions for the purchase of land might be offered to these zamindars and the surplus labour might be introduced to zamindars who were short of labour. These men would then spread the news in their villages and others would follow if the conditions were satisfactory to them.

(*b*) I am not aware of any acute shortage of agricultural labour in Sind. I think land with a good water supply is never out of cultivation for want of labour, but I have been out of touch with actual agriculture as seen by the district officers for the past twelve years and conditions may have changed since the War. For the transplanting and reaping of rice a good deal of extra labour is needed for a short season, and in the principal rcie tracts, *viz.*, Larkana and Begari and the Mithrao and Karachi district areas this labour comes in from the adjoining country, *i.e.*, from Baluchistan and the Thar Desert respectively, and returns in time for its own harvesting or cattle tending.

(*c*) I doubt whether this will be necessary in the newly opened areas under the Barrage. If the available lands are sold by auction, the buyers will import their own labour if necessary, more especially as a number of

the buyers will doubtless come from over-populated and fully developed areas in the Punjab and elsewhere. If not, it would be possible to encourage the development (and sale) of such lands by giving free water and no assessment for the first one or two years after sale. This should prove a great inducement and would not cause a great loss to the State if it were found really necessary. The increased competition and sale value due to such concession would probably more than cover the temporary loss of revenue, or the collection of assessment might be postponed for one or two years and collected thereafter in instalments.

QUESTION 19.—FORESTS.—(*a*) I am not sufficiently conversant with present practice.

(*b*) Yes, by granting remission (partial or total) of assessment for areas sown with firewood producing trees, or fixing low assessments for same and for fodder crops.

(*c*) I should think there certainly would be, for the supply of firewood, charcoal and cheap timber for the villages.

QUESTION 20.—MARKETING.—This is a matter where the commercial community could give the best opinion.

QUESTION 21.—TARIFFS AND SEA FREIGHTS.—(*a*) The customs duties on agricultural implements and machinery must increase the price to the cultivator though they are very low, being only two-and-a-half per cent, I believe. Still, every little helps, and they might be removed. Even if local manufactures spring up, competition is always healthy, and there will be need for some imported implements and machinery for years to come.

(*b*) Sea freights are often very high. It should be considered whether supplies for co-operative societies could not be shipped by the Director General of Stores, London, under his freight contract, which is on more favourable terms than the open market.

QUESTION 22.—CO-OPERATION.—(*a*) Every possible step should be taken both by Government and non-official agencies to encourage the growth of co-operation which will be one of the greatest factors in future prosperity and development. I would suggest that Government should employ an expert in this work from, say, Sweden or Denmark, or from England, if this work has been sufficiently developed there to give real experts. I do not consider that the employment of amateurs from the ranks of the I.C.S. is the best method of developing specialised subjects. These officers may be able men and Jacks-of-all-trades, but they are masters of none, since they never devote a life time's study and practice to any one subject. It is not so much administrative capacity which is required as intimate knowledge of methods, and long experience of applying them. If the right type of man with these qualifications is selected, he will be quite able to tackle the administrative side of his work. There must be many such available.

(*b*) I am not sufficiently conversant with recent developments in the organisation of the various co-operative societies to know whether the following suggestions have or have not already been tried, but I give them for what they are worth.

(*i*) *Credit Societies.*—If these can arrange advances to meet the current expenses of cultivators for developments, and on reasonable terms, against fairly devised mortgages on holdings, live or dead stock, or crops, they should be of great value to the industry. The question of advances for domestic purposes is a very difficult one, since indebtedness on extortionate terms must react on the cultivator's ability to finance his land. If anything can be done to repay such existing debts and substitute a loan on reasonable terms, while at the same time preventing future extravagance, it would be a great help to agriculture.

(*ii*) *Purchase Societies.*—I have already suggested in reply to Question 14 (*b*) that co-operative societies should stock, sell on easy terms, and repair implements and machinery. They might also possibly hire out such implements purchased from co-operative funds; but this would probably be unsatisfactory and difficult to arrange on fair terms.

(*iii*) *Sale of produce and stock.*—I believe very great success has been obtained in Europe by such work being done on a co-operative basis and it seems well worth while for an *expert* to investigate this, if not already done.

(*iv*) *General improvements to land.*—Where such improvements are of general benefit to the locality they might with advantage be carried out on a co-operative basis, but for improvements affecting individuals only, the granting of credit by the co-operative society would seem to be the only assistance possible.

(*v*) *Aggregation of fragmented holdings.*—Please see reply to Question 7. The carrying out of suggestions made therein might possibly be left to co-operative societies as regards the future. For holdings already uneconomic it would seem better for the State to acquire and re-distribute them by sale. Otherwise, much bitter feeling might be started which would ruin co-operative movements generally.

(*vi*) Wealthy societies might purchase and run the more expensive types of machinery such as power ploughs, threshing machines, sugarcane crushers, rice-hullers, etc., making fixed charges for the work done. It would probably be better to encourage private enterprise to supply this need, as business experience and management would be essential to economic success.

(*vii*) *Joint farming.*—I have no experience but it seems a very doubtful expedient.

(*viii*) Ditto.

(*ix*) Please see reply to Question 17 (*h*).

(*c*) Yes, provided a large proportion of the area affected was in favour of it, and provided the scheme was approved by experts.

(*d*) My personal knowledge of the working of co-operative societies was gained many years ago when they were in an incipient stage (about 1909 to 1912). They then promised to be very successful but I have only casual information about them since, as I have been on special duty for the past twelve years, and have had few opportunities of seeing their work in the districts.

QUESTION 24.—ATTRACTING CAPITAL.—(*a*) Improve the water supply by making it assured and thus reduce the great speculative element of agriculture. Capital and enterprise will follow where there is a reasonable probability of being able to raise crops every season.

(*b*) The greatest discouraging factor is probably the complete uncertainty as to whether water will be available. Its absence or deficiency means the complete or partial loss of all capital and enterprise put into the lands.

QUESTION 25.—WELFARE OF RURAL POPULATION.—(*a*) Please see reply to Question 17 (*h*).

(*b*) All such enquiries are useful if the information obtained is properly applied. The cost would be considerable and the gain would probably not appear for a generation, but should be considerable eventually.

QUESTION 26.—STATISTICS.—(*b*) Results should be published much more quickly and in an intelligible and interesting form. The usual blue book is years out of date by the time it is published, requires a Cook's conducted tour through it to find what is desired, and is put up in the dullest and least interesting form possible, with masses of useless statistics which would be better omitted from the point of view of clarity and expense.

Oral Evidence.

59353. *The Chairman:* Mr. Musto, you are Superintending Engineer of the Lloyd Barrage Circle?—Yes.

59354. We have your note of evidence; would you like to make any statement at this stage?—I do not think so; if you examine me, other points may come out.

59355. Is the work in connection with the Barrage proceeding satisfactorily up to date?—Yes, I think so.

59356. So that, as far as you can tell, the water will be available in 1931; is that the position?—I am doubtful of that; 1932 I should say.

59357. Have you interested yourself, at all, in the drainage which will be necessary to avoid waterlogging?—Very much. I have provided a very large sum of money in the project for drainage works.

59358. The Commission has been told by another witness that, as far as the drainage goes, there has been some change in policy and, whereas it was the original intention to construct the drainage *pari passu* with the canals, it has now been decided to postpone the construction of the drains until the canals have been cut; is that so?—I have no official information on that point.

59359. But have you interested yourself in the details of the drainage scheme which it is proposed to put into effect?—Not since I prepared the project; I have nothing to do with that now.

59360. In preparing the project you also prepared the drainage schemes, did you?—Yes.

59361. In your judgment, are those schemes sufficient to guarantee that no undue waterlogging and soil deterioration will take place?—As far as I can tell, yes; I omitted nothing that I thought was necessary.

59362. Do you attach importance to drainage?—Very great importance, yes, and my personal opinion is that drainage works ought to be carried out side by side with the construction of the canals.

59363. You have, I think, had experience of the administration of irrigation schemes in India?—Yes, I have had charge of a canal district.

59364. Would you tell the Commission quite shortly what that experience has been?—I held charge of a district in which all the canals were inundation; there were no perennial canals. The inundation canals were fed direct from the river. Some of them were fairly modern canals, re-modelled inundation canals, and the others were very old ones, the relics of the days of the Mirs. The modernised canals had cross-regulators and it was possible to regulate levels to a certain extent to give rotations; but, owing to the cultivators' outlets being in all cases open outlets and in some cases without even *pucca* heads, it was extremely difficult to distribute the supply equitably. In the older canals there was no attempt at cross-regulation in the canals; there were no cross-regulators and many of the heads of the cultivators' outlets were simply cuts through the bank. With that arrangement it was practically impossible to effect any distribution of the water: the man at the head took all that he wanted.

59365. Have you any experience of distribution through A. P. M.'s?—Not personally, no; they have been introduced since I held charge of the district; but I have studied the literature on the subject and I have inspected many of them working, and I am quite sure they are a solution of the problem.

59366. Is it your intention to distribute through A. P. M.'s in this scheme?—Yes.

59367. They are more popular with the man at the tail than with the man at the head?—Yes, naturally the man at the head knows his share will be cut down to an equitable share of the total quantity in the canal; he naturally does not want to lose anything. The man at the tail, of course, will get a fairer share of the water.

59368. Have you considered, at all the possibility of experimenting with the sale of water on the volumetric basis?—No, I consider it is impracticable at present; we have not had sufficient experience, so far as I know, in any part of India to justify it being sold by volume. I am not sure what progress they have made in the Punjab.

59369. *Sir Thomas Middleton:* In designing the drainage system, how far were you able to go into detail? You laid down the alignment of the main arterial drains; were you able to get to work on the main feeders?—Yes, I not only laid out the main valley lines but also any cross-valleys that I could find: any sort of tributaries into the main valley.

59370. But at this stage your design would represent the arterial drainage?—Yes, quite.

59371. Has any consideration yet been given to detailed drainage questions: the planning of the size of section for which you will provide a main feeder and that type of work?—In the project I provide a direct channel, as I called it, down the centre of the valley line: a channel with varying widths according to the size of the area that it fed. I do not know what has been done since; I am not connected with the details of the scheme since, except the Barrage.

59372. You were for some time connected with the Agricultural Department?—I was.

59373. In designing agricultural machinery I think?—Not exactly designing it: in purchasing and erecting, and so on, agricultural machinery.

59374. To what types of agricultural machinery did you give special attention?—Principally pumping plants, but also sugarcane crushers, cotton gins, rice hullers and so on.

59375. What are the classes of machinery that, in your opinion, want first attention by the Agricultural Department?—More the implements than machinery I think: first of all the plough and then the harrow and other tilling implements.

59376. Do you think there is much work to be done on these?—Yes, a great deal; the present country plough used is the primitive thing which must have been used by Adam in the Garden of Eden.

59377. But in the Deccan especially they have got on very well in designing the type of iron plough wanted?—I believe they have.

59378. They have also a very efficient harrow?—Yes, there is a local firm there that makes them; I believe it is Kirloskar Brothers.

59379. Did you pay any attention to chaff cutters?—Very little; I had no enquiries for them practically: I think I supplied one or two *jowar* cutters.

59380. There appears to be quite a big demand for chaff cutters in some parts of India?—There would be, I should think.

59381. What are the types of water lifts that you suggest?—Principally centrifugal pumps; that is the best and simplest form of water lift for most conditions.

59382. For very low lifts have you ever used the Archimedean screw?—I never have; I have seen it working on a lift of about a foot-and-a-half, I think; that is the only one I have ever seen at work.

59383. *Dr. Hyder:* You say on page 90 of your note of evidence that some of this water should be stored. What is the name of the district through which the Gaj Nai flows?—The Gaj Nai issues from Baluchistan and flows through the Western Nara district.

59384. Is it under Sind administration?—The Gaj Nai itself, or rather the mouth of it where it debouches on to the plain, is in the Western Nara district, but the whole course of the stream is in Baluchistan; the mountains from which it issues are in Baluchistan.

59385. I ask you this, because you might get into difficulties with another administration?—Certainly; we shall have to arrange with the other administration.

59386. Then you want the use of tractors for deeper cultivation; do you think that is advisable in the circumstances of India?—Yes, certainly.

59387. Deeper cultivation?—Yes; not necessarily at present in Sind, but I think even now it would probably be one of the greatest factors in reclaiming *kallar* soil. I have very bad *kallar* soil in my own garden in Sukkur and I find the only cure for it is constant deep digging and exposing it to the air.

59388. What deep-rooting crops would you suggest?—There are not many in Sind at the present moment; sugarcane and castor are the only two I can think of at the moment, but with more intensive cultivation it will surely be necessary to plough deeper.

59389. Have you got any labour from Baluchistan?—Yes, a considerable amount.

59390. Brahuis?—Yes, many.

59391. They must have changed considerably then?—No; they come down. Do you mean in my works?

59392. Yes, the Baluch or the Brahui?—Yes, they both come down.

59393. *Sir Chunilal Mehta:* Is there much scope for pumping plants in Sind?—A certain amount. I think they might be substituted for Persian wheels in many cases where the lift is low.

59394. Would you also pump direct from the river; is that possible?—It is done already in a few cases, but of course there are very few waterlifts directly on the river. Just near Sukkur is the only place I know where there are many plants on the river itself.

59395. It would be a very big area spread over Sind that could be served by pumping plants?—Yes, certainly.

59396. There would be a big area?—Yes, lift areas generally; you could substitute pumping plants for Persian wheels everywhere, provided you had the capital to install them.

59397. What would be the advantage? You would serve a larger area I suppose?—Yes, and it would be cheap probably in the long run: perhaps not at present so much when the cattle are not employed all the year round, but when more intensive cultivation comes in they will have more work for their cattle, and then I think pumping plants would certainly pay them. Even now there are two pumping plants on the river bank at Sukkur, put in by the zamindars themselves and worked by them, which have taken the place of Persian wheels.

59398. You make certain suggestions here about fragmentation of holdings; do you consider the evil really serious yet in Sind?—Not so much in Sind I think; though I believe it is becoming serious in parts. But in the Deccan certainly it is.

59399. And you would like something done?—I should think it is very necessary.

59400. *The Raja of Parlakimedi:* On the first page of your written evidence, you speak of the necessity of investigating methods of preventing waterlogging. Do you apprehend any waterlogging on this system?—If the system is abused, certainly; if too much water is given, if drainage is not attended to.

59401. You are going to see to the proper distribution also?—We hope to; there is a great deal of agitation for lower duties and so on, and that is a thing which has to be definitely settled.

59402. I should like to know what has been the real cause of there being such a small number of roads in Sind?—That is very difficult for me to say; it is a matter of general policy; I take it that it is lack of funds.

59403. Is there a real need felt in this part of the country for transport?—Yes, very real; there is considerable difficulty in making roads in Sind. You see, there is no suitable material; it is a difficult problem. That is merely a question of cost; naturally you can bring materials from anywhere if you have got the money to do it. The serious difficulty in making roads in Sind

is the lack of materials except in a few special areas like Sukkur and Hyderabad where you have stone available. You have to find some substitute for stone. The cost of carting stone and carrying it for long distances is almost prohibitive.

59404. The material has to be brought from long distances?—Yes; or you can make roads of brick. This is a matter for experiment. I tried to get experiments made years ago but could not get the funds for it. Mr. Harrison is now experimenting with oiling earth roads: putting waste oil on earth and ramming it; I believe it is extraordinarily successful and makes a very hard surface.

59405. What has been the effect upon the roads of the Reforms?—I am not a district officer now; I have not been a district officer for twelve years, so that I am not quite in touch; but I understand the district boards have let the roads go rather badly. I use hardly any roads except the ones I have made myself, so that I am not in a position to speak on the subject.

59406. What sort of interest do the municipality take in their roads?—Judging by the roads I have to drive over in Sukkur, none at all. I wish I could claim damages from the municipality for the damage they do to my car in driving over them.

59407. Have you had opportunities of trying tractors upon fields where wet cultivation is adopted?—No, never; I have used steam ploughing plant; I started the first steam ploughing plant in the Bombay Presidency; that was used in the Dharwar district; but it was black cotton soil and it was only used after the rainy season was over. It was impossible to use it in the rainy season.

59408. I think, even in wet fields, deep ploughing could be managed with tractors?—Yes, I think so, especially nowadays with the caterpillar tractors; they will get over almost any ground.

59409. Do you not think they will be useful?—Very useful I should say.

59410. What method would you suggest to make them easily accessible to the ryots?—I think probably the best way is either to encourage a company, private enterprise, to start a ploughing business, or get a wealthy co-operative society to do it; but private enterprise is best. What is necessary to make the thing a success is sound business management. If you make it easy for private enterprise to start, I think they could probably do it successfully with great advantage to the cultivator.

59411. Are not the co-operative societies interesting themselves in this?—Not that I know of; it is rather a big thing for a co-operative society to tackle; it would probably cost about a lakh of rupees to get a plant going.

59412. They would have a central organisation?—Yes, what I would suggest is either a firm or a co-operative society to have a plant and to take on ploughing for the different cultivators at a fixed rate per acre.

59413. Lending them?—Not lending the plant, no; they would work the plant themselves. The co-operative society or business firm would work the plant themselves and simply charge so much per acre for ploughing. I think that is the only way you are ever going to make it a success.

59414. *Professor Gangulee:* I want to clear up one or two points on the question of irrigation, based on remarks made by some of our witnesses. It has been said that the Lloyd Barrage, by cutting off the level of the Indus below it, is going surely to have a very adverse effect upon the non-barrage tract. Do you agree with that view?—No, I think the Lloyd Barrage will have very little effect on the water level below it; we are practically 300 miles from the next off-take and I think we shall have very little effect. We have an enormous reservoir between the barrage and the next off-take, and that reservoir will be filled up at intervals. It is only in very bad years that we shall take out practically the whole of the river water, and then only for a day at a time probably. In the interval the reservoir between us and the next canal will be filled up again.

59415. Then what will be the source of water to the non-barrage tract: from well irrigation or reservoir?—From the reservoir, from the river itself as at present; the river itself forms the reservoir.

59416. The second point is as to the insufficiency in the number of regulators; complaints have been made of that by one of our witnesses; he says we want more regulators in big Government canals at short distances to give a constant level of water?—But is he speaking of the existing canals?

59417. Yes?—Yes, probably. Cross regulators are useful to a certain extent, but without regulated outlets they are of very little effect.

59418. The distance between one regulator and another is very great; he says within eighteen miles of the Fuleli Canal there is only one regulator?—I am not in a position to speak of the Fuleli; I do not know it well.

59419. He says modules have been introduced in hot haste in canals with fluctuating levels and they have failed to make equitable distribution; do you agree with that?—No, not at all. Modules have been under consideration for the past twenty years. I do not know whether he considers that hot haste; it may be for the East.

59420. There is one more point; he says sufficient attention is not paid to clearance of canals and he suggests that a special revenue should be earmarked for the purpose?—I think all that is required is spent. No money is earmarked for the purpose; the engineers survey the canal every year and see what clearance they consider necessary and they ask for funds for it.

59421. Turning to your note, do you consider that it is necessary to have a central research station to investigate the problems inherent in the modern methods of irrigation?—Yes, I have said so.

59422. I know you have said so. Would you have that sort of research station under the Provinces or under the Central Government?—Under the Provinces, certainly. I have not said a central research station; I said, maintaining experimental stations at several points in the Barrage area; I would suggest a number of experimental farms.

59423. Only to investigate agricultural problems arising out of irrigation? —Yes.

59424. Where would you carry on hydraulic experiments?—They could be carried on possibly at Sukkur. I have also suggested, not here but elsewhere, the appointment of a research officer to investigate purely irrigation hydraulic problems.

59425. Will those fundamental questions on irrigation be investigated provincially or centrally?—Both, I should think: provincial and co-ordinated by a central authority.

59426. What machinery do you suggest for that co-ordination?—I think the existing machinery is sufficient. Of course, the Inspector General of Irrigation has been abolished. I would suggest the replacement of that officer; he was an invaluable officer.

59427. You do not think it would be necessary to have a Central Irrigation Research Station under the Inspector General of Irrigation?—No, I do not think so.

59428. Are you satisfied with the contouring of the land under the Barrage?—Yes, certainly.

59429. Is it closely done?—Yes.

59430. That will be invaluable for your drainage schemes?—Quite.

59431. On page 91, you are discussing the question of assessment, and you say "It would be sound business to give full remission of assessment for the first year's crop", and you go on to recommend a series of remissions. Is that under the consideration of Government?—Not that I know of.

59432. Have you placed this view before Government?—No. I am not sure what the question is.

59433. The question is "What measures should Government take to encourage the reclamation of areas of cultivable land which have gone out of cultivation"?—It seems to me that some such scheme as I have indicated would be a good encouragement. You will notice that I say that we should give them remission in addition to the ordinary seasonal remission. That is to say, if a man produces a four-anna crop, he is in any case entitled to a

certain amount of remission, and in addition to that I would give him remission of half the ordinary assessment. That is very good encouragement.

59434. Are you familiar with the co-operative movement in the Punjab?—No.

59435. Are you familiar with that of the Presidency?—I have stated that the only touch I had with it was twelve years ago, when it was in its infancy.

59436. You do not consider the co-operative movement involves a lot of administrative work?—Yes, a certain amount. Every business does.

59437. You say that you do not consider that the employment of amateurs from the ranks of the Indian Civil Service is the best method of developing specialised subjects. Are you referring there to the co-operative movement?—Yes; any specialised subject.

59438. Do I understand you to say that the Registrar of Co-operative Societies should be recruited from specialised officers?—Yes, if possible; if they are available. Or, if an officer of the Indian Civil Service is selected for the post, I think he should remain in it. Having been trained in the work, he should remain in it, and not go to another job as soon as a better job is available.

59439. *Mr. Kamat:* You foreshadow the possibilities of one or two other barrages in Sind, one at the extreme north of Sind and one below Kotri?—Yes.

59440. Within that distance of time, do you visualise the possibility of having these barrages in Sind?—That is an extremely difficult question to answer. As far as the desirability of them goes, I should say within fifteen years. But there is the political situation to consider, there is the financial situation to consider.

59441. Within fifteen years, supposing both these barrages come in, do you think they would be a financial success?—It is impossible to say until the project is prepared.

59442. About the possibilities of further extension of irrigation in the rest of the Presidency, have you any views whether all the possibilities of some of the bigger rivers have been thoroughly exploited?—I have no sufficient knowledge as regards that.

59443. It has been urged in certain quarters that the Bombay Irrigation Department is now making the fullest use of the Bombay rivers?—I am not sufficiently familiar with the conditions of the Presidency now. I have been away from the Presidency for over fourteen years.

59444. You say that the existing methods of distributing canal water in Sind are entirely unsatisfactory, and you also add that module outlets have been under consideration for some years?—Yes.

59445. Are you coming now to any definite, final conclusion about the desirability of module outlets?—I think we have come to that.

59446. It has been definitely decided?—Yes.

59447. Both for Sind and other parts of the Presidency?—I cannot speak for other parts of the Presidency.

59448. If they are suitable for Sind, they ought to be suitable for the other parts of the Presidency?—Yes.

59449. *Professor Gangulee:* Is that the A. P. module?—Each type has its own points. Some are more suited for some conditions, and some for others.

59450. *Mr. Kamat:* You were responsible for designing a boring plant called the Musto plant?—Yes.

59451. And you had some experience in that line?—Yes.

59452. Speaking about implements and their designs, you suggest that there should be workshops in Sind and possibly in other parts of the Presidency?—Yes.

59453. Supposing such workshops were to be established, do you think Government should start them, or should they be started by private enterprise?—It should be left to private enterprise.

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59454. You suggest private enterprise should start these workshops?—Yes. Government would never make a success of that.

59455. There are only two private firms, Kirloskar Brothers and another firm, that have applied their minds to the manufacture of implements, but in the other parts of the country there is hardly any private enterprise coming forward. Have you any views as to why private enterprise, say in Madras or Bengal or the Punjab, is not coming forward?—Manufacture of implements is a mechanical subject. India is hopelessly behindhand in mechanical matters, as you probably know. To start any industry of this nature successfully, I think you must have European control, not entirely perhaps, but I think you should have European organisation to start it anyhow, in the same way that the mills in Bombay have been started by Europeans and are now being managed largely by Indians. I think there is a good deal of political bias against this, and European firms are not keen to invest their money, especially out in the jungle, where these things are wanted.

59456. Can you suggest any remedies to stimulate private enterprise in this respect?—I have pointed out in my note that one of their principal difficulties at present is the difficulty in realising their sale values, getting their money in. If co-operative societies became responsible for that, I think a good deal of the difficulty would vanish.

59457. That is so far as the sale of the implements is concerned. I am talking of the mechanical knowledge required for the manufacturing concern?—I do not know how you can encourage Indian firms with mechanical experience to make a start. I am not sure that they would not start automaitcally if co-operative societies were prepared to put down the money for the implements that they made.

59458. You state that agricultural officers have not the requisite agricultural and mechanical knowledge to alter or suggest new designs?—I do not say not to suggest new designs. I think they have not sufficient mechanical knowledge to understand the difficulties that are involved when they suggest changes. To alter the design of an implement ever so slightly means a great deal of additional cost in manufacture.

59459. Your statement is "The officers of the Agricultural Department are non-technical men who do not understand the manufacture side of the matter"?—Yes.

59460. Do you imply that there should be more mechanical people recruited in the Agricultural Department?—No; certainly not.

59461. *Professor Gangulee:* There is the Agricultural Engineer's department at Poona?—Yes, but it is not his job to design implements. That is a matter for the trade. The remedy for that, I think, is for the trade to send their own men to the country to study what is wanted.

59462. *Mr. Kamat:* It would not be worth while recruiting purely mechanical men to the Agricultural Department?—No: no firm will accept other people's designs. If they do, they will only lose money. It is one thing for a man to design a thing that he thinks is suitable, if he is not responsible for making it a profitable investment, and quite another thing if the man who designs it is responsible to his firm, to see that it pays.

59463. *Mr. Jamshed Mehta:* What is your exact position in the Barrage?—I am in charge of the Barrage Circle. I am in charge of the building of the Barrage and head works and the head of the largest canal.

59464. When, do you think, will the building of the Barrage be completed?—I have already stated that I believe it will be completed between 1931 and 1932.

59465. Did you have a hand in the designing of the Barrage?—I designed the whole of the Barrage and the canals.

59466. You suggest the building of some other barrages, and you say that it will be necessary within the next fifteen years?—They may be.

59467. When, do you think, ought Government to start with the actual schemes?—In my opinion, they should start an investigation of them at once.

59468. Do you know whether Government is considering this subject?—No.

59469. Do you think a special department of engineers for making such schemes will be necessary, or do you think the present staff of irrigation engineers can do it?—We have always managed to do so hitherto.

59470. Have you got the staff at present?—If the question is whether we have sufficient men, then the answer is, no. In my opinion, we have not got sufficient men to carry on the works we have in hand. They are understaffed.

59471. Therefore, you would recommend additional staff for making these schemes for Sind, or do you want a separate department?—No. Additional staff is all that is required. We want additional staff for working the Barrage and the canals when they are completed.

59472. You have made some statements about water coming from Baluchistan and other places. Are these places within the limits of the Bombay Presidency?—No. They are outside. That would be a matter for arrangement.

59473. On page 90, you say that in the Punjab the modules have been successful?—Do I?

59474. You say "There is a number of successful modules in use in the Punjab"?—Yes, and on the Jamrao system in Sind.

59475. Did you hear of that success from the zamindars or from the officials?—I do not meet the Punjabi zamindars. I have very few opportunities of going to the Punjab. I do not meet the Punjabi zamindar except occasionally in Sind. I got it from the literature on the subject.

59476. Have you had any opportunity of getting the opinions of the Sind zamindars or landholders about modules? Are they in favour of it, and do they like it?—I believe the tail zamindars are very much in favour of it, because they hope to benefit by it, but the zamindars at the head are very much against it, because they feel that they will lose a share of the water that they now get unfairly. That is human nature.

59477. There is a suggestion made by one witness, an important witness of the zamindar class, that the distribution of water should be left to the zamindars. Do you agree with it?—It would be a very nice state of things for him if he is at the head.

59478. You just stated in answer to a question that, in your opinion, Lower Sind will not suffer by the Barrage?—Not appreciably.

59479. Is it upon your own investigation?—It is my own investigation. You will find it all recorded in the Barrage volumes.

59480. *Sir Thomas Middleton:* You have expressed an optimistic view about the future use of the tractor in Sind?—Yes.

59481. Do you not think that the character of your soil, the amount of fine sand present, will give you very great trouble in various parts?—It will, to a certain extent, but nothing more than any other machinery. I do not anticipate any serious difficulty from that. It is a difficulty undoubtedly, but you run trains through it.

59482. I happened to come across the work of tractors in a very sandy tract in England; there they had great trouble with wearing parts?—It is not insuperable.

59483. It is not insuperable, but it is very costly?—Yes, it will increase the cost to a certain extent.

59484. It would require specially designed bearings?—Probably yes. That can be done.

(The witness withdrew.)

KHAN BAHADUR AZIMKHAN INAYATALIKHAN, Assistant Registrar, Co-operative Societies in Sind.

Replies to the Questionnaire.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(*a*) Demonstrations of improved methods of farming on the fields of cultivators carried on through organised bodies consisting of leading zamindars and cultivators who command confidence are found useful in improving the practice of the cultivators. I have some experience of agricultural propaganda work having remained as propaganda officer in certain talukas in Sind for the last four years in addition to my own duties as Assistant Registrar of Co-operative Societies. I am given two Agricultural Inspectors and six District Agricultural Overseers with whose help demonstration and propaganda work is being carried on. In my opinion the co-ordination of the Agricultural and Co-operative departments has been of much success in improving the state of cultivators. The research side of the Agricultural Department finds out the various seeds, implements and methods of farming that will be suitable for particular tracts and in order to introduce and give wide publicity to the improvements suggested, some organisation is necessary, and taluka development associations have been deemed to be the best media for materialising this idea. The associations consist of zamindars of the taluka as a whole, most of them being members of co-operative societies. An executive committee is elected each year, under whose control and guidance the work of propaganda and demonstration is carried out. The programme of the associations' work is framed each year in consultation with the expert advice of officers of the Agricultural Department. Each association maintains a depôt of seeds and implements wherefrom select seed is issued for cultivation, and implements issued both on hire and sale. The associations also maintain their own *kamgars* and supervisors who, under the advice and guidance of Agricultural Inspectors and Overseers, carry on demonstrations from village to village, on the fields of the agriculturists, of various implements and methods of farming. As far as possible the *kamgars* work the improved implements side by side with those previously in vogue and this carries home to the people a first-hand idea of the superiority of the new types of implements over the old ones. The following are some of the improved implements, seeds and methods of farming which have been found useful and command great appreciation:—

1. *Implements.*—Egyptian plough, Meston plough, Rajah plough, Chattanooga plough, Monsoon plough and Screw water lift.

The Egyptian plough has now very largely replaced the primitive Sindhi plough in the propaganda area assigned to me. In design it is as simple as the Sindhi plough and can be manufactured locally, but its work is far superior specially in the soft soil. The Meston is an iron plough as cheap as the Egyptian but is fit for hard soil too.

2. *Seeds.*—27 W. N. cotton, Bhitshah cotton and Pusa 12 wheat.

3. *Methods of Farming.—Dry ploughing of land after harvest.*—(*b*) Experience has shown that whatever be the number of leaflets and pamphlets issued, lectures delivered, or even farm demonstrations held, the agriculturists do not so much appreciate or understand the improvements as they do when demonstrations are held on their own lands. Once they appreciate them they take to them with fullest fervour. I am reminded in this connection of one practical instance. One zamindar of Mirpur Mathelo taluka had some time back ploughed one survey No. of his with the Egyptian plough and sown Pusa 12 (a select variety of wheat) in it. Side by side with that plot he cultivated another plot, ploughed it with the Sindhi plough and used an ordinary variety of wheat seed in it. The contrast was remarkable. Not only were the *haris* or the zamindar himself impressed with the superiority of the modern lines of agriculture, but several zamindars and *haris* of the neighbouring villages too came to see

the two plots. The cultivation of such comparative plots, being highly successful and instructive, is deserving of every encouragement and the various taluka development associations have now concentrated their attention on it.

(c) An expert must try first to win the confidence of the people before people will abide by his advice. Further, I may be permitted to add that expert advice when conveyed through organised bodies like the taluka development association is likely to be followed and taken in more easily and rapidly than through direct communication with the individual agriculturists.

QUESTION 5.—FINANCE. (*a*) To meet the needs of the agriculturists, co-operative societies are the best organisations. They ought therefore to be developed in the areas where they already exist and introduced where they do not. In Sind such societies have been meeting the current needs of the members fairly satisfactorily as the district Central Banks which finance them have sufficient funds at their disposal. To meet the needs of big zamindars whose needs cannot be satisfied by the ordinary credit societies, zamindari co-operative banks have been introduced in three districts in Sind which finance individual zamindars upto Rs. 5,000 per head. As for big land improvement schemes or redemption of old debts long term loans are necessary and they could be negotiated through land mortgage banks. Steps are therefore very necessary for the organisation of such banks with powers to issue debentures. In Sind there are several big zamindars who have heavy old debts to pay and the land mortgage banks will be specially suited to redeem such zamindars as also to finance big schemes of land improvement. The third kind of agricultural finance is the Government *taccavi* grant. In my opinion such grants may be given only for land improvement schemes in the tracts covered by co-operative societies, through societies. In places however where co-operative societies do not yet exist the Government *taccavi* grants may be continued for current agricultural operations as well.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—(*a*) (*i*) The main causes of borrowing in my opinion are:—

1. The debts inherited by the agriculturists from their forefathers.

2. General illiteracy and want of business capacity of the village agriculturists. These contribute towards their perpetual indebtedness and thralldom as they cannot check their personal accounts with the banias nor can they get adequate prices for their produce.

3. Heavy rates of interest which the agriculturists are required to pay to the usurers.

4. Their extravagant ceremonial expenses. The Sindhi zamindars are well known for their marriage and other ceremonial expenses which cost them much. Moreover their hospitality is proverbial.

5. Uncertain income due to uncertain and oftentimes inadequate water supply. There being practically little monsoon in Sind, cultivation depends largely on the caprices of river Indus.

(*ii*) The sources of credit may mainly be enumerated as under:—

1. The village *sowcar*.

2. Co-operative societies.

3. Government *taccavi* grants.

4. Sometimes the agriculturists contract forward sales and get advances from *sethias*.

(*iii*) The chief causes which prevent agriculturists from repaying their loans punctually are the failure of crops owing to absence of monsoon, uncertain water supply of the river and adverse winds. The agriculturists in Sind hardly get a good crop once in three or four years. Moreover, whatever yield they get does not bring them an adequate return as, at harvest time, the prices are found generally at an ebb. Nor have the agriculturists in their turn the means or the adequate business capacity to hold back their produce till better prices are attainable.

The agriculturists are generally simple and honest folk and good pay-masters so long as they have money. But the causes enumerated above make it oftentimes very hard for them to repay their loans punctually, much to the detriment of their outside credit.

(*b*) Some of the remedies against agricultural indebtedness have already been indicated in stating the causes therefor. While very facile credit is the agriculturists' bane, it ought to be remembered that productive debt is by no means an evil.

Among others, the following remedies will go a great way to remove agricultural indebtedness:—

1. Formation of co-operative credit societies and land mortgage banks.

2. Organisation of purchase and sale societies to supply the agriculturists with their daily requisites as also to obtain better prices for their produce, and improve market conditions.

3. Inducement to the agriculturists to employ their spare time usefully, *e.g.*, in cottage industries, etc.

(*c*) In Sind owing to the enforcement of the Deccan Agriculturists' Relief Act and the Sind Encumbered Estates Act the credit of agriculturists has fallen considerably with the sowcars and they do not therefore generally advance cash loans to them except by obtaining out right sale deeds executed by them for land worth several times the value of the loans advanced. An oral agreement however exists between the parties that the land will be restored to the borrower if the loan is repaid within a certain period. Experience has shown that the properties thus sold are seldom restored to the original owners. To prevent this the enforcement of the Land Alienation Act to Sind appears very necessary. This will enable the agriculturists to retain possession of their land and if at all they are inclined to raise money by selling it they will at least get the prevailing market rate, from the agriculturists who alone will be entitled to purchase it.

I am strongly of opinion that non-terminable mortgages should at once be stopped.

QUESTION 17.—AGRICULTURAL INDUSTRIES.—(*a*) On an average, the cultivator generally works from April to December on his fields. During the slack season the good agriculturist generally engages in dry ploughing, carrying produce to the market for sale, clearing water-courses, collecting manure, etc., but most of them remain idle. Those who have a good number of cattle are engaged in rearing them, and disposing of milk, butter and *ghi*.

(*b*) The Sindhi agriculturist is rather averse to adopt any industry other than that connected with agriculture. He is very fond of cattle-rearing and cattle-breeding, but this industry cannot be pushed on any extensive scale on account of want of pasture lands. There are some people whose only avocation is cattle-rearing and they, in the absence of pasture lands, move about from place to place in search of such grounds. If such pasturages were provided in convenient places, it would be easy for the cultivator to take more interest in cattle-breeding as a subsidiary occupation.

Poultry and dairy farming are two other forms of subsidiary occupation which appeal to the Sindhi agriculturists and they will take to them with great zeal and fervour if steps are taken to run them on modern methods and provide adequate transport arrangements for the produce.

(*c*) The chief obstacle in the expansion of the subsidiary industries referred to in Sind is that the Sindhi zamindar generally considers it derogatory to do any manual work not connected directly with agriculture. Moreover he is rather apathetic by nature and does not easily make up his mind to employ his leisure time usefully and profitably. It requires therefore some propaganda to induce him to action.

(*e*) I would very much advocate the establishment of industrial concerns in rural areas. This has the advantage of removing congestion in big

towns and distributing population between towns, cities and villages in a more rational proportion. Government can prohibit establishment of more factories in big towns on grounds of sanitation, etc., and attract them to rural areas by grant of concessional plots to them and providing easier facilities for water, etc. The factories cannot have permanent labour in the *mofussil* as there is already shortage of labour in Sind, but the leisure time of the agriculturists could very usefully be employed by the proposed arrangement.

(*f*) The idea is well worth giving a trial.

(*h*) The best way to induce the village people to devote their spare time to village sanitation is by requiring in the first instance the Sanitary Department to depute their inspectors to deliver lectures as to the precautions to be taken against malaria, influenza, pneumonia and other common diseases. The advantage of quinine against malaria should be brought home to the people. Magic lantern shows may be organised, wherein the people may be shown what dangers there are in allowing unhealthy tanks and pools round about the villages, as they are the breeding places of mosquitoes. How to fill up such tanks, how to purify wells, where and how to dispose of the filth and refuse of the village, should be some of the chief subjects on which lectures should be delivered. When such ideas of sanitation are well rooted in the agriculturists they will of their own accord form their village committees to look after proper sanitation in the village in their spare hours.

QUESTION 18.—AGRICULTURAL LABOUR.—(*a*) (*i*) The Province is sparsely population and the area of arable soil is very vast. Naturally, therefore there is a cry of general deficiency of labour. Fortunately, however, Sind is bounded all round by dry tracts such as Cutch, Marwar and Baluchistan where rainfall is generally scanty. The people inhabiting these tracts therefore migrate to Sind in search of labour and thus make up for the local deficiency. When these tracts, however, get plentiful rains and the migratory tribes return to their hills and plains for cultivation, some difficulty is experienced on account of shortage of labour.

(*ii*) As stated above, Sind possesses cultivable area far in excess of the population available in the country to cultivate it. Besides, irrigational facilities are not available for cultivation of the whole of the arable soil. There is, moreover, shortage of labour even for the occupied cultivable area. People, therefore, carry on extensive cultivation of crops by rotation. The remedy seems to be in the permanent migration of the tribal labour from the bordering countries and the following measures might succeed in securing it:—

1. Grant of liberal terms of *batai*.

2. Humane and equitable treatment on the part of the landlords towards the labourers.

3. Grant of facilities to labourers to get village sites and water arrangements.

4. Grant of small holdings to selected labourers to settle down as peasant proprietors.

(*b*) In Sind, the shortage of labour is due to the fact that there is generally little monsoon and cultivation is carried on on the river water only, which too is very uncertain. During the last three or four decades irrigational facilities have been considerably improved and large areas rendered fit for cultivation. On the other hand, there has been no commensurate increase in the labour. This accounts for the shortage of labour in the Province.

The remedies to meet the shortage have already been suggested in paragraph *a* (*ii*) above, *viz.*, inducing the migration of the bordering tribes.

(*c*) The question does not arise in Sind at all as there is no surplus agricultural labour.

QUESTION 20.—MARKETING.—(*a*) and (*b*) The present marketing system in Sind is defective, specially as regards cotton which is the chief commercial product in Sind.

Khan Bahadur Azimkhan Inayatalikhan.

There are no regular markets for cotton to which it could be carried and sold. Cotton-ginning factories are situated in some of the important cotton centres. The owners of such factories appoint agents in big villages and the agents in their turn appoint sub-agents who are generally the local village *sowcars*. Daily quotations of cotton are communicated by the factory owners to their agents and the agents in their turn arrange to communicate them to the sub-agents. Owing, however, to lack of proper postal and telegraphic arrangements in the *mofussil*, the village sub-agents cannot get quotations daily but they do get them every third or fourth day. The village zamindars effect transactions of cotton with the village *sowcars* who generally do not quote the proper market rates. The agriculturist is thus at the mercy of the village *sowcar* so far as the rates of cotton are concerned. In weight also he is at his mercy as the *sowcar* does not generally use true weights.

The factory owners make their own transport arrangements for the transport of cotton from the fields to their godowns and, after ginning and pressing, send on the pressed bales to the big firms at Karachi who in their turn arrange for shipment of the bales to the proper destination.

The present arrangement is defective from the following main standpoints:—

1. That the producer does not get adequate price or weight of his produce.

2. There being too many middlemen, *e.g.*, the village *sowcars*, agents of factories, the factory owners themselves and the intermediate firms at Karachi, the actual cost to the consumer is very heavy as each middleman charges his own percentage of commission.

3. The factory owners gin and bale cotton generally without sorting or grading it and so, except in rare instances, no premium is given to the cultivators who grows a superior variety. There is, therefore, no inducement to the cultivators to grow select varieties of cotton.

To meet the above difficulties, I would in the first instance suggest that the Government may provide means whereby daily quotations of cotton, market conditions and general information regarding cotton may be made available to the cultivator. The other difficulties, *e.g.*, of proper weights, etc., will, in my opinion, be well solved after the Marketing Bill is passed and comes into operation as a regular Act.

QUESTION 22.—CO-OPERATION.—(*a*) (*i*) The co-operative movement is primarily the people's movement and as such all attempts for its expansion and development should legitimately be expected to emanate from the people, the function of Government being mainly to arrange for audit and to see that no infringement or violation of the Act and rules takes place. Commensurate with the growth of the movement should, therefore, be the strength of the Government staff for the above functions. As regards propaganda, supervision and development, I would submit that till the Co-operative Institute and other non-official bodies are able to gather sufficient strength, the official and honorary staff should be adequately maintained. Honorary organisers are non-official gentlemen, recruited generally from the agricultural class, and as such command much confidence of the people. While, therefore, they are required for a long time still to educate the people in the principles of co-operation and management of primary credit societies in the tracts already covered by the movement, their need is far greater for the formation and development of similar societies in tracts where co-operation has not yet set its foot.

As regards agricultural non-credit societies, they require much business capacity and experience to make them successful. With a view to encourage their growth and development, a special propaganda officer is necessary who, after studying the local economic conditions, should be able to furnish advice and opinion how these institutions may be run successfully. The feasibility of entertaining special propaganda officers for non-credit societies should receive sympathetic consideration from Government.

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(*ii*) The Central Co-operative Institute, Bombay, and its branches are the best non-official bodies which could carry on the work of propaganda and development of the co-operative movement. They should, therefore, enrol more members and collect more funds to be really able to execute the legitimate portion of their duties. Government might also subsidise them adequately to enable them to play their part well.

Taluka development associations and supervising unions are also non-official bodies which can and do play an important part towards the growth and development of the movement. These institutions also deserve sympathy and encouragement.

(*b*) *Observations on credit societies.*—(*i*) The growth of primary credit societies in Sind has been fairly satisfactory. In 1918 when the Province of Sind was placed in charge of the Registrar, Co-operative Societies, Bombay Presidency, and a separate Assistant Registrar appointed for it, there were only sixty-three simple credit societies with a membership of nearly 3,000 and a working capital of 1½ lakhs. To-day there are over 900 co-operative societies with a membership of nearly 40,000 and a working capital of nearly 1½ crores. These societies are fully satisfying the needs of their members so far they relate to their current agricultural requirements. Some of the societies have gone still further and have (out of their own resources) redeemed the old debts of some of their members and finance them also for small land improvements. With such adequate finance the agriculturists have in several villages severed their connections altogether with the moneylenders. They have effected improvements in cultivation and increased both the area under cultivation as also the yield of the land. Some have, partly with their own savings and partly by raising loans from societies, purchased new lands also. In short, a distinct change for the better is visible in the life of the agriculturists where co-operative societies have been established.

In the beginning, co-operative credit societies were confined only to *khatedars* (persons actually holding lands) but subsequently it was found that the *hari* (tenant at will) also stood in as much need of finance as the landlord. Gradually, therefore, steps were taken to enlist *haris* also into societies. For getting loans, however, they are invariably required to furnish, as sureties, only such of the members as are actual holders of land.

The maximum lending limit in primary credit societies being rather low for large landholders, steps have been taken to organise zamindari banks on the same credit principles but while simple societies can lend money only up to Rs. 500 in the ordinary course and Rs. 1,000 with the special sanction of the Registrar, the zamindari banks can advance loans to individual zamindars up to Rs. 5,000. Three institutions of this kind have so far been established and are working satisfactorily. They have gone a great way to meet the requirements of big zamindars and as such have become very popular with them.

(*ii*) *Purchase societies.*—There are a few seed and supply societies in Sind, but, in my opinion, they could be run better if their area of operations were widened and if they were supplied with seeds, implements and other agricultural requisites from some big central agency. For this, special Government facilities are required, *e.g.*, half the cost of running expenses may be borne by Government for the first five years and one-fourth for the next five. Free advice of Government specialists on the technical side of the business should also be afforded.

(*iii*) *Sale Societies.*—Whatever arrangement may be made to provide adequate and cheap credit to the agriculturists, or select seed, manures and implements, experience has shown that they do not stand to gain much by them unless and until arrangements are made for the disposal of their produce at proper rates. On account of the tricks of the middlemen in rates, weighments, etc., the agriculturists do not realise fair prices for the produce. Through co-operative sale societies they get proper rates, prices and true weighments. Besides, if at harvest time there is a slump in the market on account of the rings formed by the *sowcars*, the sale societies advance about three-fourth of the value of the grain deposited with them

to the agriculturists for their needs and dispose of the grain when favourable prices are restored. In the absence of co-operative sale organisations, the produce is purchased by the village *sowcars* who do not generally make full payment for the whole quantity purchased. They pay the amount piecemeal. Moreover, in several instances the *sowcars* adjust the produce towards the old debts of the agriculturists. By selling through sale societies prompt and full payment is ensured. There are, however, difficulties peculiar to Sind in the working of cotton sale societies, *e.g.*—

1. The big merchants generally contract forward sales with the agriculturists and grant advances. Produce must therefore go to them. The sale societies cannot undertake this speculative sort of business.

2. Again there are transport difficulties. The agriculturists generally do not carry their produce to the central places for sale. They sell on the spot to the agents of factory owners who make their own transport arrangements. The sale societies in their turn find it difficult to do so in the beginning.

3. Before entrusting the produce to sale societies the agriculturists insist on immediate settlement of the rates, and co-operaive sale organisations cannot offer quotations before getting the produce and actually disposing it of.

The Marketing Bill on the table of the Bombay Legislative Council might to some extent meet the difficulties but a special Government officer for non-credit work is, in my opinion, very necessary for organising and developing the sale societies.

Oral Evidence.

59485. *The Chairman:* Khan Bahadur Azimkhan, you are Assistant Registrar of Co-operative Societies in Sind?—Yes.

59486. The Commission has before it your note of evidence, which we have had an opportunity of reading. Do you wish at this stage to add anything to that statement, or may we ask you a few questions?—You may ask questions.

59487. I think you have been Assistant Registrar of Co-operative Societies in Sind since 1918?—Yes.

59488. So that, you have witnessed a very considerable progress of the co-operative movement in Sind?—Yes.

59489. Would you tell the Commission what is your experience and your training in co-operation generally prior to 1918?—I had inspected societies in Sind when I had taken over charge, and they were on the deposit system. People had to deposit Rs. 5 once and they became members. There was no principle of thrift.

59490. What I really want to get from you is whether you had seen any co-operative work in other parts of India or elsewhere?—When I was appointed, I was deputed to study co-operation in the Bombay Presidency, the Punjab and other parts.

59491. You made a tour?—Yes. I toured for about three months in the Presidency and in the Punjab.

59492. Did you find that valuable?—It was of very great value. It helped me a great deal in organising societies here.

59493. On page 108, you have given us a statement of the progress of the movement. The growth of primary credit societies in Sind is fairly satisfactory?—Yes.

59494. There were only 63 primary credit societies in 1918, and to-day there are 900?—Over 900.

59495. Can you give the Commission any idea as to how many societies have been closed down owing to their being in an unsatisfactory state?—About 15.

59496. What is your policy; to close down where things are unsatisfactory, or leave them alone?—We close down when there is mismanagement, and when the people are found to be heavily in arrears.

59497. Do you find that the individual co-operator in Sind understands the principles of co-operation?—Yes; generally.

59498. How has he learnt those principles?—We have been holding conferences annually in every district, and there are the training classes for managing committee members and secretaries.

59499. You hold conferences in districts?—Yes. There are the training classes for managing committee members and secretaries. Then there are the honorary organisers who go about from village to village and explain the principles of co-operation to the members of the managing committees and other members in general. Then there are the auditors and myself. All of us meet the people and explain to them the principles. The societies that have been in existence for more than three years are now doing well, and the members know their business and principles very well.

59500. You have a centralised meeting for all Sind?—Yes, we have got a Co-operative Institute for Sind, with headquarters at Hyderabad, which organises centralised meetings.

59501. You hold an annual conference?—Yes. Such conferences are held under the auspices of the Institute.

59502. That is something quite different from the district conferences that you have told us about?—Yes.

59503. In what language are the district conferences conducted?—In the vernacular, Sindhi.

59504. Is the meeting at which representatives from all Sind gather together conducted in the vernacular?—Yes. In the district conferences

the representatives of all the societies of the district attend; in divisional conferences, representatives of all the districts attend.

59505. The business is conducted in the vernacular?—Yes.

59506. Are you satisfied with the working of the Central Banks?—They are doing very good work.

59507. How many Central Banks are there?—Six.

59508. How about the audit? Are you satisfied with your audit?—Yes. Audit of every society is conducted every year by the Government auditor, and for the banks a special auditor comes from Bombay.

59509. How long a time does it take for your auditor to audit the books of primary societies?—Two or three days.

59510. Is that not going pretty fast?—No. It is quite enough, because in the village societies the transactions are very small.

59511. Your experience has been that when you get outside the credit purpose, there is some difficulty in obtaining management?—Yes.

59512. Is it your general policy rather to extend on the credit side than to make experiments on the side of sale?—After establishing credit, in one area we have organised four sale societies. Two of them are doing fairly well and two are yet new. But we have difficulties in organising such societies, which I have stated in my note.

59513. I think the link between the co-operative movement and the Agricultural Department in Sind is very close?—Yes.

59514. And you yourself have worked hard at recommending agricultural improvements when you have been going round, quite apart from your work in connection with the co-operative movement?—I have been doing agricultural propaganda work in addition to co-operation.

59515. Is the co-operative movement in Sind distributing any seed?—Yes, there are the taluka development associations which have been distributing seed.

59516. But that is through the taluka development associations?—Yes.

59517. There is no co-operation?—They are registered under the Co-operative Societies Act.

59518. Are they registered as co-operative societies?—Yes.

59519. All of them?—All of them in Sind.

59520. Are they credit societies?—They are not credit societies.

59521. Are they better farming societies?—Yes, they are similar institutions. There are three functions that they are doing. In fact, the aim of the taluka development associations is an all-round development of agriculture and the general amelioration of the condition of the agriculturists. First they develop agriculture, and then co-operation. They have many other activities also. As regards agriculture, I have given full details in my note. They have each a trained *kamgar* who goes from village to village, and demonstrates on the fields of the cultivators modern implements side by side with the local ones, and proves to the people the superiority of the modern implements. For co-operation they entertain a supervisor who inspects all the societies in the taluka and trains secretaries and managing committee members. He places the inspection memorandum before the managing committee of the association, and in that way they have been helping co-operation. There are other activities also which they perform in addition to this. They ventilate the grievances of the agriculturists. On the representation of associations, several silted canals have been cleared, water facilities have, in some cases, been afforded to people, inconveniences have been enquired into and remedied, and forest facilities offered. Besides this, they have been distributing quinine free. These are the things that most of them are doing.

59522. How are these taluka development associations, when they are co-operative societies, organised? Have they any capital?—Yes. Each ordinary member has to pay one or two rupees. There are two classes of ordinary members, paying one rupee and two rupees; a life member pays

Rs. 25, and patrons pay Rs. 200. In these associations there are a good number of life members and ordinary members. Government also gives them a subsidy, equal to the amount of expenditure, subject to a maximum of Rs. 1,000.

59523. Is any work of this nature being carried on in districts where there is no taluka development association at work?—I was given eleven talukas for intensive agricultural propaganda work, and I organised taluka development associations in them, in order to carry on agricultural propaganda work through them; but in other places we have supervising unions who have supervisors, and they too have been carrying on the same work, to some extent. Beyond these there is no other agency.

59524. Are there any taluka development associations which are not co-operative societies?—No. All of them are registered as co-operative societies.

59525. In answer to Question 6 *(iii)*, you say that the cultivators do not hold up their crops in hopes of obtaining a better market. Is that due to lack of marketing credit?—They stand in need of money at the time of the harvest.

59526. That is it. They lack marketing credit?—Yes.

59527. They cannot hold the crop?—No, they cannot hold the crop generally.

59528. Is any wood for fuel grown co-operatively in any district?—No.

59529. Have you interested yourself in the improvement of the breeds of animals?—No, at present we concentrate our attention on credit, but we are going to non-credit also; we have started some non-credit societies.

59530. Are the taluka development associations taking any interest in animal husbandry?—No.

59531. They interest themselves only in cultivation?—Only in cultivation.

59532. Not at all in animals, improving breeds or improving the practice of looking after animals?—They are considering it.

59533. When was the first taluka development association founded?—About four years ago.

59534. So that they are quite young?—Yes.

59535. What about your cotton sale societies; are they doing well?—We have no cotton sale societies in Sind; we propose to start them as early as possible.

59536. Have you considered, at all, the advisability of forming cotton salt societies?—Yes, we are thinking of starting some.

59537. What about management?—For that we will have to secure competent managers. The Sind Central Co-operative Bank has appointed an officer and deputed him to go to the Presidency to see how the sale societies are being run there; after he returns from the Presidency we will make a beginning here.

59538. What exactly is your staff?—I have got one auditor for every district (in all six), one Deputy Assistant Registrar whose post has been in existence for the last four years in order to relieve me to do agricultural propaganda work; besides these, there are honorary organisers.

59539. How many honorary organisers have you?—About sixteen district honorary organisers.

59540. Do you think they are enthusiastic; are they doing good work?—Yes.

59541. Is the movement guided mainly by officials?—No, by non-officials.

59542. Mainly by non-officials?—Yes. In the beginning, the movement was initiated by the department and societies were organised by it; but later on the work was given to honorary organisers; and then came the Co-operative Institute which has taken up the work of organisation and supervision to some extent.

59543. Do you find that many of your primary credit society members borrow from the society and aslo borrow from the *sowcar*?—Among members

of those societies which have been in existence for more than three years, there is hardly any member who borrows from the *sowcar*. In the case of new societies which have been in existence only for one or two years, the members generally borrow from both the *sowcar* and the society in the beginning. But I do not know of any society of three years' standing whose members borrow from the *sowcar*.

59544. Have many societies financed their members' debts?—Yes. Small debts have been liquidated by many societies; in some cases the Central Banks have also advanced loans to them for that purpose.

59545. To individuals?—To individuals through the societies, to liquidate old debts. And I think members of a good many societies are now free from debt, but there is still a large number of members who require long term loans.

59546. When a Central Bank makes a loan for the liquidation of a member's loan, what form does the loan take?—Debt redemption loans; they are long-term loans.

59547. For ten years?—For five years, generally.

59548. Secured on mortgage?—Yes. The old mortgages are redeemed, and loans are advanced on the mortgage of the land of the borrower.

59549. Do you think that the activities of the co-operative credit societies have yet had any influence on the rate of interest charged by the *sowcar*?—Yes; I think the rate of interest in areas in which co-operation has developed has been brought down to a certain extent.

59550. What, in your judgment, is the principal factor which tends, in Sind, to prevent the more rapid spread of co-operative credit?—It is the illiteracy of the people.

59551. Do village feuds tend to prevent the growth of village societies?—No. We have generally few big villages; we have many hamlets. In places where co-operation has developed, I think village feuds have been brought under.

59552. You group hamlets together?—Yes.

59553. *Sir James MacKenna:* Do you find repayment of loans regular?—Mostly regular in Sind.

59554. And as soon as a loan has been repaid, do you issue a similar or a larger amount on the same day?—Not on the same day; after some time, when the normal credit statement is prepared the amount is given according to the agriculturist's requirements.

59555. Has there been a marked improvement in the quality of societies during the last nine years; are the societies registered in 1918 on a better footing now than they were in 1918?—Yes; they have accumulated very large share capital and also reserve funds, and they are in a flourishing condition generally.

59556. Have they got their own capital?—Yes; they borrow from the banks, and they have their own capital as well.

59557. And reserve funds?—And reserve too.

59558. Who are the guiding spirits of your societies as a rule?—The members of the managing committee.

59559. Who is the secretary as a rule?—He is an agriculturist generally.

59560. Not a schoolmaster?—Sometimes, when we are not able to find any agriculturist as secretary, then a schoolmaster is selected, but generally we have agriculturists as secretaries.

59561. And you find that the agriculturist secretaries have got sufficient education to keep accounts and books?—Yes.

59562. What sort of education have they; 4th standard?—4th, 5th or 6th standard.

59563. *Professor Gangulee:* You state that the taluka development associations are registered under the Co-operative Act. Under what classification are they put down?—They are non-credit societies.

59564. You say that the executive of the taluka development association is elected every year. Could you tell us how they are elected?—They are elected, as managing committee members of other bodies are elected, by the general body.

59565. One man one vote?—Yes.

59566. Who are the members of the taluka development associations?—The zamindars and the people of the taluka, most of whom are members of co-operative societies.

59567. Is there any *hari* (cultivator) as member?—Yes.

59568. He has the same number of votes as the zamindar?—Yes, everyone has got one vote.

59569. You described the taluka development associations and you told us, in brief, their programme of work. Do you find that they have developed a spirit of self-help?—Yes, a good deal; in fact, the propaganda work is being carried on by them; they have got their own establishment, and the associations which have been in existence for the last three years have been doing work independently.

59570. With the Government subsidy of Rs. 1,000?—Yes; they get half of their expenditure subject to a maximum of Rs. 1,000.

59571. Do you think that for extending their activities the taluka development associations require more money?—No; I do not think so; what they get is quite enough. I know that in the Presidency they have asked for more than Rs. 1,000 and Government have given the same to them; but I think the funds in Sind are quite adequate to meet the expenditure.

59572. Turning to the co-operative movement, before you form a primary society do you undertake a preliminary survey of the area in which the society is going to be established?—The work of organisation is being done by honorary organisers nowadays. They go to the place see the people, explain to them the objects of societies and ask them to see the working of neighbouring societies and so on. Sometimes they have to go twice or thrice. They see whether a good chairman and a secretary are available and whether good managing committee members can be got to conduct the work. Then they hold an enquiry into the needs of the people, etc., and make a report to us; we examine the papers and submit them to the Registrar.

59573. Who are the members of the primary societies; landlords or *haris*?—Both zamindars and *haris*.

59574. Both belong to the same society?—Yes. But, as I have stated, for big zamindars we have organised a few zamindari banks and zamindars who pay an assessment of Rs. 500, and more can become members and get a loan up to the maximum of Rs. 5,000. At present we have organised only three such institutions, one in Thar Parkar, one in Larkana and the third one in Shikarpur.

59575. Could you tell us what proportion the membership of *haris* bears to the membership of the zamindars in the best organised of your primary societies?—In Thar Parkar district more than half are *haris*, and in the Hyderabad district, where the number of small holders is larger, we have got a larger number of *khatedars* as members.

59576. You told us that the members of the societies understood the principle of co-operation; do you find those members acquiring the virtue of thrift?—Yes. Every member is required to invest in the shares of the society a certain amount every year; the very fact that they have invested more than they are bound to invest and that the share capital has reached in several societies up to Rs. 4,000 or Rs. 5,000 shows that they have understood that principle. Each member as a rule is subscribing in shares ten rupees in the first year, twenty rupees in the second year, fifty rupees in the third year, and so on, quite voluntarily.

59577. You explained to us that loans are sanctioned for redeeming old debts; for what other purposes are loans sanctioned?—For small land improvement schemes, for seeds, for manure and for all current needs.

59578. Supposing a member borrows from the society Rs. 500 for land improvement, but spends out of that three hundred rupees on a marriage ceremony, is there any check?—Yes. In the case of land improvement loans, a great check is exercised by the managing committee.

59579. But how do you do that?—The managing committee is required to see to that.

59580. *Sir Chunilal Mehta:* Will you please explain yourself a little more clearly?—In the case of land improvement loans special care is taken to see that money that is given for land improvement is devoted to that purpose only. Even in the case of loans for current needs, the managing committee are required to see that every member uses the loan for the purpose for which it is taken.

59581. *Mr. Calvert:* Suppose a man takes Rs. 500 for land improvement, and instead of spending that loan on land improvement spends it on the marriage of his daughter, what happens then; that is the question?—I know of no such instances. Under our rules and practice the managing committee is required to see to it and they do keep a vigilant watch over the proper use of loans.

59582. *Sir Chunilal Mehta:* You said that you knew of no such instance. In the case of loans for land improvement the managing committee is perhaps capable of seeing how far the money has been used for the purpose for which it is taken. I suppose loans are taken also for current needs. You know that in Sind you can take loans up to a maximum of Rs. 1,000. Supposing one-third of the loan is used for purposes which are not current needs of agriculture, then what is the result?· If the managing committee find out that the member has misused the money in this way, what happens?—We recall the money.

59583. That is all; there is no other punishment?—No. The movement was in its infancy, and no punishment was given.

59584. And now?—Now, there is a strict watch which is effective and has given good results.

59585. How do you keep a strict watch?—Through the managing committee.

59586. *Professor Gangulee:* Is there any limit to the maximum amount of loan admissible to a member?—Ordinarily Rs. 500 is the limit, but with the sanction of the Registrar loans up to Rs. 1,000 may be advanced.

59587. You state that in Sind owing to the enforcement of the Deccan Agriculturists' Relief Act and the Encumbered Estates Act the credit of agriculturists has fallen considerably with the *sowcar*. Can you explain that?—The Manager, Encumbered Estates, has power to cancel mortgages and take possession of the land. What happens as a result is that the village *sowcar* nowadays gives only seed, grain and provision to the zamindar on credit but no cash. Cash is given in the case of big and influential zamindars only, but to ordinary zamindars the *sowcar* refuses to give cash loans except on outright sale of land.

59588. Is it your view that the Deccan Agriculturists' Relief Act and the Encumbered Estates Act have functioned successfully in Sind?—Yes, they have.

59589. You say the enforcement of a Land Alienation Act in Sind appears very necessary. What is your reason for holding this view?—Because, at present, on account of the Deccan Agriculturists' Relief Act and the Encumbered Estates Act, outright sale deeds are executed, and in most cases the land is not returned to the zamindars. If the Land Alienation Act is passed, the land, if sold, will go only to agriculturists who will pay the market price for it at least. As I have said, it now goes at less than the market rate.

59590. Are you familiar with the Punjab conditions? You visited the Punjab; did you not?—I visited the Punjab for only a short period.

59591. Do you know how the Land Alienation Act works there?—I heard from people there that it was working very well.

59592. Do you think that the conditions in Sind are similar to those of the Punjab?—I do not know exactly, but as this Province is a neighbouring Province, the conditions should to a certain extent be similar.

59593. The point is, do the conditions which compelled the Punjab administrators to pass the Land Alienation Act exist in Sind so as to justify the enactment of such legislation for Sind?—In my opinion, on account of the existence of the Deccan Agriculturists' Relief Act and the Encumbered Estates Act, it is more necessary here.

59594. As regards labour, you speak of humane and equitable treatment by the landholders of their *haris*; what is the position now?—The zamindars take hard work from the *haris* and do not treat them well in some cases.

59595. Have many instances of such treatment come to your notice?—At least some.

59596. Are these *haris* who are badly treated members of co-operative societies?—Not necessarily.

59597. *The Chairman:* Is the *hari* able to treat the zamindar badly?—Yes, at times the *hari* runs away with the zamindar's money.

59598. *Professor Gangulee:* He cannot run away very far; can he? You are familiar with the Cotton Markets Bill in Bombay. Do you think that Bill will answer your purpose?—Yes.

59599. You say that the co-operative movement is primarily the people's movement in Sind. Most of the people are *haris* (cultivators); are they not?—Yes; but there are also many zamindars.

59600. But the *haris* predominate?—Yet the land belongs to the zamindar.

59601. Yes; the people are the *haris*. I suggest that it is not primarily a people's movement because the demand for co-operative societies did not originate from the *haris*?—In fact the *haris* are in greater need of credit than the zamindars and they have also joined the movement.

59602. Do you think the co-operative movement was of great use in the recent flood relief work?—Yes. Soon after the floods the Central Banks sent down their inspectors and other officers to enquire into the details of damages, and they advanced loans to members of societies. At the end of August about two lakhs were distributed.

59603. These two lakhs were distributed through the co-operative societies?—Yes, through the co-operative societies to members of co-operative societies. Now, we have under contemplation the formation of housing societies for those people whose houses have been damaged or demolished. We have already organised about ten societies, and I think before the end of November we shall organise societies in about thirty villages more.

59604. You said that the co-operative movement is primarily a people's movement; may I ask you whether the communal poison has entered into this movement?—No, not so far.

59605. *Mr. Kamat:* You have been working as propaganda officer for two years, combining the two posts of Assistant Registrar of Co-operative Societies and Agricultural Propaganda Officer. Do you think this arrangement is suitable for large areas? How many do you manage at present?—At present I am managing eleven talukas.

59606. Without any detriment to the co-operative movement?—Yes, because I have been given one deputy who relieves me of my co-operative work to a certain extent. I have put him in charge of two districts, and four districts I have taken over myself.

59607. If that deputy were not given to you, as combined Propaganda Officer and Assistant Registrar how many talukas would you be able to manage?—I think three or four talukas.

59608. Have you any agricultural training?—No. I have been given a staff of agricultural experts, graduates, who have been carrying on the work.

59609. But in your own capacity as Agricultural Propaganda Officer you have no knowledge of technical questions?—No knowledge of technical

questions; but here we have to propagate only a few things: pure seeds to be distributed, modern implements to be popularised and modern methods to be adopted; so, in consultation with the agricultural officers, the work is done through the taluka development associations; I simply help them in the work.

59610. Has this system been tried in other parts of the Presidency to your knowledge?—No, I do not think so.

59611. Is this the first example in Sind?—Yes.

59612. And you think it can work satisfactorily?—It has worked satisfactorily.

59613. From your own point of view?—Yes. The Agricultural Department have also appreciated it.

59614. With regard to the taluka development associations, on an average how many villages in the taluka have you here in this part of the country to look after?—We have got *dehs* consisting of hamlets and villages; there are about fifty to sixty *dehs* in a taluka consisting of several hundreds of hamlets and villages; sometimes a *dehs* consists of even ten or fifteen hamlets.

59615. You are counting it in terms of *dehs*; I am trying to find out how many taluka development associations would be really necessary for a taluka: whether one or two?—One I think is quite enough.

59616. One would be quite able to cope with the work of all the villages concerned?—Yes; they can appoint more *kamgars* if they find it necessary.

59617. Take a concrete case and tell me how many villages that particular taluka has and with how many of those villages your has association come into contact?—As a matter of fact, all the associations have visited all the *dehs* in the taluka within these three or four years.

59618. That does not mean much. You mean to say that each village has been visited on one day out of the 365 days? Will you make your statement clearer. I want to know whether each village has received your attention sufficiently in regard to propaganda so as to make your work effective?—Yes.

59619. Now take any particular village and tell me how many days you work there?—We can take in the Hyderabad taluka, the Hatri group. The taluka is divided into groups; there are four groups in the taluka. In each group, of course, in the beginning I spent about ten or fifteen days, and then again after two or three months I went there and spent about five or six days. In that way three times at least in a year I have been going there.

59620. I have not yet received an answer to my question. Take a particular village. On how many days or how many times has that village received your attention?—I say from time to time, not at one time.

59621. Never mind that. Take any village in Hyderabad taluka; which one have you in mind?—Hatri.

59622. How many days could you pay attention to that village, say in one year, or in two years or four years?—I do not remember exactly the number of days, but I have been there several times a year and the work is actually carried on by the agricultural experts under the control and guidance of the taluka development association's committee; I simply help them, draw up a programme for them and see how they have been working.

59623. In short, each village gets sufficient attention from your *kamgars* in a steady continuous manner so as to make the work effective; is that it?—Yes.

59624. With regard to these demonstration plots, you have illustrated the fact that demonstration is effective if there are comparative plots, twin plots?—Yes, that is very successful because it convinces the people very much.

59625. Where demonstration is done on the cultivators' plots, is it quite essential in your experience to have these comparative twin plots?—Yes.

59626. A single plot is of no use?—A single plot is not of much use. If the new and old methods of farming are demonstrated to them in this way, it appeals to them very much.

59627. So that it is essential for good work to have two rival plots?—Yes, for demonstration purposes.

59628. You refer to the effects of the Deccan Agriculturists' Relief Act here. Are the provisions of that Act very much applied in Sind?—Yes, except some sections, it is applicable to Sind.

59629. *The Chairman:* I am not sure the witness understood that question. Is this Act often invoked?—Yes.

59630. It is often used?—Yes.

59631. Your answer was that it applied except as regards some sections?—Only one section.

59632. *Mr. Kamat:* Except for one section the Act is applied to the rest of Sind?—Yes.

59633. Are the effects of that Act good or bad?—They are good.

59634. Are you aware that in other parts of the Presidency there is a feeling that the Act ought to be repealed?—No, I think here it is working well.

59635. If it is working well, why do you want the Punjab Land Alienation Act?—It has become necessary on account of the above two Acts to apply the Land Alienation Act to Sind, as stated by me in the written note.

59636. Under the Deccan Agriculturists' Relief Act, what happens, if I understand you aright, is this: if a man wants a small loan as compared with the value of his land (say his land is worth Rs. 5,000 and he wants a loan of Rs. 500), he borrows it from somebody on a nominal sale deed of his land; is that the case?—Yes, in most cases.

59637. Now if the Land Alienation Act were applied to Sind and the same man wanted a small loan of Rs. 500 on his land of the value of Rs. 5,000, to whom would he go: to an agriculturist?—Yes, because generally the sales to the *sowcar* are done for a nominal price, and it would therefore be preferable for him to go to an agriculturist who will give him the market value.

59638. Yes, but you desire that one agriculturist should go to another agriculturist for a loan?—Yes, in order to get the market price if the land has to be sold.

59639. But is that possible?—Yes.

59640. You mean to say there are agriculturists who are richer and who are in the habit of giving loans?—No, no agriculturists give any loans; I am thinking of the position if the land is to be sold.

59641. You are talking of sales only?—Yes.

59642. But what will be the position of those wanting loans, under the Deccan Agriculturists' Relief Act?—They can have co-operative societies.

59643. You are branching off on to something else; you mean you want to drive them to societies?—Not drive them exactly, but that is the best solution.

59644. In that case neither the Deccan Relief Act nor the other Act will work; your case does not cover either?—The people can get their loans from the societies easily.

59645. Then you say you want societies?—Yes, for the good of the agriculturists. At present, on account of these Acts, much of the land passes out of the hands of the agriculturists.

59646. In this Province, is there a very large number of rich zamindars? —There are big zamindars but not rich zamindars; there are very few rich zamindars.

59647. Say from twenty thousand acres and upwards?—Yes, in some cases.

59648. Generally do they contribute to the taluka development associations to the extent of Rs. 1,000 in full, or even more if you want it from them?—No. Ordinary members pay only one rupee subscription, life members twenty-five and patrons two hundred rupees; the association also receives a subsidy from Government according to the expenditure.

59649. Are all those associations drawing the full value of the subsidies? —Not all, but some of them do get Rs. 1,000.

59650. That means they have not made up their private subscriptions of Rs. 1,000 in the case of all the associations?—Yes, not all.

59651. Although there are rich zamindars in Sind. Are there rich zamindars on their subscription lists?—There are some.

59652. They also contribute only one rupee?—No, they are mostly life members and pay twenty-five rupees.

59653. Why are you suggesting that there should be special propaganda officers for the establishment of co-operative purchase or sale societies? Is your department, as at present equipped, unable to understand the business principles of sale or purchase societies?—No, the point is that the propaganda officer will first study market conditions and see how these sale societies have been working in the Presidency; then he will be a member of our staff and will carry on the work.

59654. *Mr. Jamshed Mehta:* You have been speaking about the Deccan Relief Act and the Encumbered Estates Act. The statement has been made that owing to these two Acts credit has come under dispute; that means that the *sowcar*, the moneylender, is not willing to lend the money owing to the restrictions imposed by the Act?—Yes.

59655. Now, supposing the co-operative societies are not started, you are not able to start them at various places or the people do not want co-operative societies, do you still propose that these Acts should be maintained?—Yes. I told you that at present the village *sowcar* ordinarily gives his customers only grain, seed and some money for miscellaneous expenses, but not big cash loans. A rich zamindar who has got credit with the village *sowcar* or with whose influence he has been dealing with his *haris*, is given some cash loans also, even without executing a bond; but in ordinary cases he refuses to give cash loans except when an outright sale deed of land is executed.

59656. You have been carrying on agricultural propaganda for some time; have you been doing this because of your own personality, because you come in touch with the people, or on behalf of the Co-operative Department working as such?—I was the first man to organise co-operative societies in Sind and they were found very successful. That is why I was given this work.

59657. I will make my question clearer. Would you recommend or advocate that the Co-operative Department should be given charge of agricultural propaganda?—No, not the charge but there should be co-ordination.

59658. You made a statement that so far the co-operative societies have worked absolutely without any communal poison; do you anticipate or fear or have you seen any signs of that feeling?—No. In the case of house construction societies, however, we have been organising in every town one society for Hindus and one for Musalmans.

59659. But in the ordinary credit societies you have not yet seen any particular preference given to one community or the other?—No.

59660. *Mr. Kamat:* With regard to this last question, as to communal societies, I suppose such societies have been formed years ago?—I do not know that about village societies.

59661. Hindu housing societies have been formed round about Bombay for years?—Yes.

59662. I mean it is not a recent phase? It is well recognised by your department?—But I am talking of the villages; in the villages we had only one credit society for a village so far, but now we have separate ones for Hindus and Musalmans, in case of house reconstruction. What I am trying to point out is that it is not a recent poison as you suggested.

59663. *Mr. Jamshed Mehta:* Do you think the zamindari banks are quite in accordance with the principles of co-operation; do you approve of the zamindari banks on the principle of co-operation?—Yes. The big zamindars are as much in need of loans as the small landholders and so these banks are started.

59664. But why need we start co-operative banks? Would not they go to the Imperial Bank and the other banks to get the money?—No, I do not think so; the joint stock banks refuse to give them loans generally.

59665. So that this is a *via media* or tentative measure which you think ought to be encouraged?—Yes.

59666. You must have learned that the Bombay Governmnet are starting two mortgage banks in the Presidency?—Yes.

59667. Do you not think one is necessary in Sind also?—Yes, very necessary.

59668. Would you like the Government to wait until they see whether the experiments in the other parts of the Presidency are successful, or do you desire that a land mortgage bank should be set up immediately?—I should like it to be done immediately because already co-operation in Sind is well founded.

59669. A witness makes a complaint with regard to *taccavi*. You know that we give *taccavi* sometimes through the co-operative societies to members?—Yes, for land improvement.

59670. Have you any suggestion to make for the improvement of the distribution of *taccavi*?—None except that it may be distributed through co-operative societies.

59671. Through societies or by any other expedients?—Through societies the system is working very well. The *taccavi* should be given adequately. At present it is inadequate. The *mukhtiarkars* give hardly Rs. 200 or Rs. 300 per head. It is not given in accordance with the requirements of the people as is the case in co-operative societies. Moreover, *taccavi* must be given at proper times; sometimes people get it in June and July when the agricultural operations are nearly over.

59672. But could you suggest any method of improvement in the agency of distribution?—No, wherever we have societies we have got enough funds in our banks; they have been lending freely. The *taccavi* which at present we get from Government is for land improvements only.

59673. That was not my question; my question was as to the actual medium of distribution. From your experience can you suggest any improvement; do you find that the people suffer from the present method of distribution?—I cannot suggest anything.

59674. You said in answer to one of my colleagues that the *haris* also are members of the societies?—Yes.

59675. Have you prepared any kind of statistics as to the percentage of the members of your nine hundred societies who are *haris* and the percentage who are landowners?—The ratio depends on each district separately.

59676. Have you any statistics?—No.

59677. Do you not think statistics would be desirable?—Yes.

59678. You have come into touch with many societies, and you have made the statement that the *haris* run away with the money. In your experience, what is the relationship between the zamindar and the *hari*? Do you think

the zamindars are at fault or do you think the *haris* are at fault? Can anything be done to improve the status of the *haris*? My question is: do you think the relationship between zamindars and *haris* in Sind is good?—Yes, on the whole I think so; but some *haris*, being very poor, actually run away with the money and the zamindars have consequently been put to loss and trouble. Similarly there are also complaints from the *haris* that they are not properly treated and that hard work is exacted from them.

59679. *The Chairman: Haris* are a little scarce, are they not?—Yes.

59680. And a little coy occasionally?—They being tenants, the zamindars can turn them out at any time; they are at the mercy of the zamindar because they have not a permanent hold on the land.

59681. *Mr. Jamshed Mehta:* That is what I wanted to know. You have been Assistant Registrar of Co-operative Societies and have been instrumental in starting many societies, as I know; have you ever thought of, or tried, any special kind of society for the *haris* by which the co-operative movement could help them to stand on their own legs and be free from the zamindars in some way?—No, they have no security, and the bank cannot advance loans to them because they do not own any land.

59682. In other words, they ought to be in permanent bondage?—Yes, they must be with the zamindars.

59683. There is no hope for them at all?—No separate societies could be formed for *haris* alone.

59684. With regard to the cotton sale societies, you know that in Sind the ginning factories generally buy up cotton?—Yes.

59685. Either as soon as the cotton is ready, or they make advances on the cotton they buy beforehand?—Yes.

59686. If such is the case, do you see any chance of the cotton sale societies succeeding, or do you think the co-operative movement will have to start a kind of co-operative ginning themselves in order to make the cotton sale societies a success?—If sufficient propaganda is carried on among members of co-operative societies, I think they will come round and give their produce to sale societies even without starting ginning factories.

59687. Would you advocate co-operative sale societies of cotton to advance money on the crop beforehand?—No, because the members of co-operative societies already receive loans from their credit societies, and hence there is no need for sale societies to advance any money to them.

59688. You have suggested in one of your answers that the credit societies should give five-year loans for redemption of mortgages. Is that done in Sind? How many societies are there of that type?—Yes. The Sind Central Bank has advanced large loans to district banks and the district banks have similarly advanced to credit societies.

59689. No, that is not my question. You answered that there are societies in Sind to whom money has been advanced as a loan for five years?—Yes. For debt redemption.

59690. To how many societies has such a loan been given?—Between fifteen and twenty.

59691. Fifteen or twenty out of nine hundred?—Yes.

59692. You also said that some of the *haris* are members of the co-operative societies?—Yes.

59693. When the zamindars or the landholders take them into their societies, what security have they got?—The zamindars stand surety for their *haris*.

59694. Is that owing to the good relationship which exists between zamindars and *haris* or is it that the zamindars get loans in this shape even through their own *haris*?—No. The zamindars generally stand sureties for their *haris* in accordance with the usual custom.

59695. With regard to the seed societies, would you advocate the purchase of seed, say potato seed, through the Stores Department of the Government? I will put it more clearly: seed has to be imported from

Italy; do you know that one of the societies tried it in our own place? Yes.

59696. Owing to some difficulty, the purchase was possibly made through some Bombay merchants, but would you advocate that we should move the Government to give us facilities for purchasing seeds through the Government Stores Department?—Yes. That would be a good thing.

59697. One of the witnesses has said in his statement that there is some kind of arrangement by which the sea freight can be made a little cheaper if we purchase through a certain department of Government; would you advocate that the Government should give this facility to seed societies?—Yes.

59698. You noted that the Bombay Government makes advances to the housing societies at six per cent, which has now been reduced to five per cent. Do you think that the housing societies in the cities or even the reconstruction societies for the floods should get money from the Government at a cheaper rate of interest through the Central Banks?—Yes, we have already advocated that.

59699. What percentage have you advocated?—I think five per cent.

59700. *Mr. Calvert:* You have formed your societies in Sind on the Punjab model of the share system?—Yes, more or less on the Punjab model.

59701. With the result that you have now about twelve lakhs of owned capital in your primary credit societies?—More than that I think.

About nine lakhs shares and three lakhs reserves?

Sir Chunilal Mehta: Those are last year's figures.

59702. *Mr. Calvert:* What staff have you under you for co-operative work?—I have six auditors and one deputy, sixteen district honorary organisers and about seven or eight taluka honorary organisers.

59703. Are the sixteen honorary organisers unpaid or paid?—They are honorary but they get travelling allowance.

59704. From what class are these honorary organisers drawn?—From the agriculturists.

59705. Are they trained?—Yes, they are.

59706. For about how long?—They are generally chairmen or secretaries of co-operative societies, and as such they have got sufficient experience and knowledge of co-operation.

59707. There are no special classes for them?—In the beginning we had classes, as the movement was new and young, but later on we selected the best from among the chairmen and secretaries who had already got enough co-operative knowledge and training.

59708. Who is responsible for teaching the members of primary societies?—Now we have got a co-operative institute at Hyderabad which has a secretary who moves about; also I and the auditors, whenever we inspect societies, hold managing committee classes for a day or two, imparting to them the main principles of co-operation and the main points to which they should give attention. The honorary organisers also attend to this.

59709. Do these honorary organisers supervise the working of primary societies after they have organised them?—Yes.

59710. They continue to look after them?—Yes.

59711. Who is responsible for liquidation?—The liquidator who is appointed for that purpose.

59712. The actual order for liquidation must be passed by you?—No, by the Registrar.

59713. On whose report?—On the report of auditors or inspecting officials. The societies have also the option to go into voluntary liquidation.

59714. Do the honorary organisers ever recommend a society to be liquidated?—Yes, in case of mismanagement, but an enquiry is invariably held to see how far his report is justified.

59715. Who holds the enquiry?—Myself or the Deputy Registrar and sometimes the auditor.

59716. Do you use your honorary organisers as liquidators?—Yes, sometimes but not of the particular tract in which the society exists.

59717. If an honorary organiser organises a bad society, he is not made the liquidator?—No. Not generally. The adjoining organisers are made liquidators. But as a rule liquidation work is done by auditors and other officials.

59718. That is to say, liquidation work is done by paid Government officials?—Yes, to some extent.

59719. However much non-official effort you may have in propaganda, all the unpleasant work must be done by paid Government officials?—Not necessarily. We have been taking work from non-officials also. In the beginning of course it was difficult. But the movement has been spreading, and we have now-a-days been getting good help from non-officials.

59720. As liquidators?—Yes.

59721. Who supervises them now?—There are quarterly statements to be sent by liquidators, and I see how the work is progressing.

59722. A paid Government staff is responsible for liquidation?—Yes, to some extent, in order that the work may be carried on efficiently and expeditiously.

59723. Any mistakes made by non-official organisers ultimately come back to the paid Government staff?—Yes, but that cannot be helped at times.

59724. To what extent are the directors of your Central Banks drawn from primary societies?—Generally there are nine directors of every district bank, of whom four are elected by societies, four by shareholders, and one is nominated by the Collector of the district. The societies have thus a voice in the management.

59725. In your Central Banks, is the voting power with the primary society or with individual members?—Each society sends its representative, and they have to vote. Individual shareholders have also the right to vote.

59726. The voting power is equal usually?—Yes.

59727. In some cases?—In all cases.

59728. Actually in Larkana, Sukkur and Thar Parkar, the individual members have outnumbered the society members?—Yes.

59729. Members of the Central Bank?—Yes.

59730. You do not try to get the whole voting power of the Central Banks into the hands of the primary societies?—No, not the whole, because there are a good number of individual shareholders also, who too have the right to vote.

59731. In those cases where you have more society shareholders than individual shareholders, you still have the half and half directors?—No. We allow one additional director after every fifty affiliated societies.

59732. Has not the Sind Central Co-operative Bank 448 society members but only 118 individual members?—Yes. But the capital of the Central Bank in the beginning mainly came from individual shareholders. They were allowed to elect five directors from themselves, three from the societies, and one was nominated. Later on, when the number of affiliated societies and capital increased, according to their rules and bye-laws they added one more.

59733. You have got nearly four times as many shareholders from societies as from individuals?—We looked to capital. The capital in the beginning came from individual shareholders mainly, and therefore they were given an important voice.

59734. In the Central Bank, does each member have one vote, or is it based on shares?—Each member has got one vote.

59735. Left to themselves, these 448 society members would be able to elect all the directors?—Not all. The individual shareholders elect their

own members. A certain number of directors is fixed in the bye-laws for individual shareholders as also for societies.

59736. Do the Central Banks in your circle derive their deposits from local sources?—Yes.

59737. You have in the rural primary credit societies round about twenty-two thousand members, and in all you have about forty thousand members?—Yes.

59738. To what extent are the remaining eighteen thousand members already accounted for in the twenty-two thousand members of your credit societies?—The membership given in my note, *viz.*, forty thousand, covers all types of societies, *i.e.*, credit, non-credit, etc.

59739. You have at times some members accounted for twice over?—Yes, in the case of Central Banks.

59740. And in the case of taluka development associations also?—Yes, partly.

59741. And sale societies?—Yes, but we have only two sale societies working.

59742. Practically, your forty thousand members are forty thousand separate individuals?—Yes, mostly.

59743. I think you mentioned to one of my colleagues that *haris* have no security to offer?—Yes, they have no tangible security to offer.

59744. What security do you insist on in primary credit societies?—Personal security generally.

59745. Is one *hari* allowed to stand surety for another *hari*?—Yes, but the general practice is to have the zamindar as surety for his *haris*. There is, however, no objection to a *hari* becoming a surety.

59746. You have no societies purely for *haris*, without the landlords?—No.

59747. Have you any societies for village menials?—No, not for villages. The Shikarpur and other municipalities are now organising such societies. At present, we have only two sweeper societies.

59748. What area do the zamindars' banks cover?—The Larkana bank serves the whole district: while Thar Parkar only two divisions.

59749. What is the liability: limited or unlimited?—Limited.

59750. What are the shares?—Nearly one lakh rupees shares in each bank.

59751. How much per share?—Fifty rupees.

59752. What is the source of your long term capital in these banks?—The banks finance their members generally for current needs. They are on the same basis as credit societies.

59753. I think you mentioned to one of my colleagues loans for ten years?—Those are special loans for land improvement and debt redemption. Zamindari banks advance loans to big zamindars for current needs, as credit societies do to small landholders and *haris*.

59754. They get most of their capital from Central Bank loans?—No. They have got deposits also besides share capital; they get some loans from the Sind Central Bank too.

59755. As security, I understand you take a mortgage deed or personal surety in the case of zamindari banks?—Mortgage of land.

59756. Mortgage of the land of the borrower?—Yes.

59757. Does he also give personal sureties?—No.

59758. Mortgages on special conditions; with possession or without possession?—Without possession.

59759. Are the recoveries so far satisfactory?—Yes. Only about seven per cent is in arrears.

59760. Generally speaking, do you find the share system popular?—Yes.

59761. *Dr. Hyder:* Do the two Acts to which you have referred, the Deccan Agriculturists' Relief Act and the Encumbered Estates Act, apply to the *haris*?—Obviously they do not. They apply to the agriculturists.

59762. But the *hari*, the cultivator, owns no land?—The Encumbered Estates Act applies to zamindars, and not to the *haris*.

59763. These two Acts do not apply to the *hari*. The point is that the credit of the *hari* or the cultivator cannot suffer on account of the existence of these two Acts, because he owns no land. That is obvious?—Yes.

59764. Do you not think that it is a good thing to place an obstacle in the path of the zamindar who is on the road to ruin? Should the law place an obstacle, or should it not?—It should, with a view to saving him.

59765. *Sir Chunilal Mehta:* You were in the Revenue Department?—Yes.

59766. How many years did you serve in the Revenue Department?—Seventeen years.

59767. You have therefore had a great deal of knowledge of the conditions of the cultivators?—Yes.

59768. Then you had this special duty in co-operative work?—Yes.

59769. Were there any special circumstances why you were put in charge also of agricultural propaganda?—Because I had toured round in Sind and organised societies there, I therefore knew almost all the zamindars of the Province. These societies were working well, and that is why I was selected.

59770. You explained that you have a system of training members of primary societies, especially members of the managing committees of primary societies. What is your system?—We organise managing committee classes, which last only for a day or two. In these classes we train them in the main principles of co-operation and the main business of the managing committees, and so on.

59771. How often do you have those classes?—Once in two years or so. In very many societies, where the members already know the principles well, there is no need for training, and we rely upon them to carry on the work independently, but in weaker societies we do as a rule hold training classes for managing committee members.

59772. How often in weaker societies?—Once a year. The honorary organisers also go and explain the principles to members. Besides the auditors, the Institute secretary and I, from time to time, when on inspection, explain the same to them.

59773. In an approved society, when a class is once held after two years, is it held for the same people?—This system has been brought into vogue only lately. Since the last two years only we have been doing it.

59774. Do you consider it useful?—It is very useful.

59775. How many times do you yourself visit societies? Do you visit each society once or twice a year?—Some societies, especially non-credit societies, I visit even three or four times a year. As regards credit societies, I concentrate my attention on the weaker and indifferent ones. As regards good societies, I inspect them on my way to the bad ones. The number has become so large that I cannot see all the societies every year.

59776. Do the honorary organisers visit the societies after they are formed?—Yes.

59777. Do they visit them often?—Yes, they generally help the managing committee members in their work and so have to visit them often.

59778. Do you take special care in the appointment of honorary organisers?—Yes.

59779. Why has special care been found necessary?—Because, if the honorary organiser is a good man, and knows his business, the societies are well organised, and give less trouble.

59780. You found some of the honorary organisers not up to the mark, and you now take special care to see that the honorary organisers are good

people?—Yes, the unfit men have been removed from time to time, and only those who have been doing good work maintained.

59781. Do the Central Banks appoint any persons to examine the working of primary societies?—Yes, they have their own inspectors; every bank has two inspectors.

59782. The working of these societies is placed before the Divisional Board of Agriculture?—Yes. Quarterly reports on co-operation are placed before the divisional board of agriculture.

59783. On which there are officials as well as non-officials?—Yes.

59784. You said that when a loan is misapplied, you do not know what happens to the persons who took the loan?—The money is recalled from him ordinarily. In extreme cases, when a member of a society is bad or incorrigible, he is removed.

59785. Do you not think that attention is required to be paid to this side of the societies' activities?—Yes, because much depends upon the proper use of the loan.

59786. What steps do you take to ensure that that is done?—We call for reports from the honorary organisers as to whether the managing committee is doing its work properly, and whether any loans are misused or misapplied. The auditor also goes there once a year, and he is required to test at least ten cases. They report cases of misapplication and necessary action is taken thereon.

59787. You recognise that in Sind it is very desirable to see that the principles of co-operation and proper application of loans are understood and followed?—Yes.

59788. Especially in Sind?—Everywhere.

59789. The Registrar of Co-operative Societies has also drawn your attention to it, and you are yourself paying a great deal of attention to this side?—Yes, it was so because the people were illiterate and backward, but now several of our members understand their business very well.

59790. In the directorate of the Central Banks you said that the societies get four directors out of nine?—Yes.

59791. Formerly there used to be no representatives, at least in Bombay, and gradually this system has been developed, by which the primary societies will ultimately control the banks?—Yes. Here also we propose gradually to give more representation to societies.

59792. You think that has been working well?—Yes.

59793. As you find the system working well, you will go on expanding?—Yes.

59794. I think you said in answer to a question that the members of the societies do not now borrow from *sowcars*?—I said that the members of those societies which have been in existence for three years or more do not generally borrow from *sowcars*.

59795. That is largely because the limit of loan has been very considerably raised in Sind?—Yes.

59796. It is much higher here than it is in the Presidency —Yes.

59797. Consequently, there is not so much need to go to the *sowcar*?—There is not, because our societies have been satisfying the needs of their members.

59798. What was the rate of interest formerly paid to the *sowcar*?—Thirty-six per cent, and even more. It depended, as a rule, on the credit of the zamindar also. Some zamindars were charged twenty-five per cent, but the ordinary zamindar had to pay thirty-six per cent, or even more.

59799. The *sowcars* used to charge scarcely less than eighteen per cent before the co-operative societies came into existence?—Yes. They used to charge more.

59800. Can you tell the Commission what have been the tangible benefits of the co-operative movement that you see now?—The members are getting sufficient loans for their agricultural operations. On that account they

are able to sow more valuable crops and there is an increase in the cultivated area, as also in the yield. Formerly, they used to sell their produce at low rates, but now they sometimes hold it up and sell when favourable rates are offered.

59801. Are the members of the societies free from debt now?—A good number of them are free from old debts. The small landholders had small debts, and after they joined societies they have become free.

59802. Do you notice any difference between the working of supervising unions and taluka development associations?—Taluka development associations deal with both agriculture and co-operation, but the supervising unions mainly look after co-operative societies.

59803. The taluka development association has a much wider field?—Yes.

59804. Why have they not included cattle-breeding amongst their activities?—They are considering it. So far, they have concentrated their attention on the use of improved implements, seeds and modern methods of farming.

59805. For instance, dry ploughing in winter?—Yes, they have been doing it on a large scale.

59806. How many taluka development associations have you now?—There are eleven taluka development associations in my charge, and three have been organised in the Jamrao tract which is attached to the Deputy Director of Agriculture.

59807. So that, each taluka under your charge has already got an association?—Yes, for agricultural propaganda work.

59808. Do you feel any necessity for having sub-associations for smaller areas under the taluka development associations?—No, not so far. No such need arises, because the taluka development associations, in some cases, have appointed even two *kamgars* to look after their work. Instead of having sub-associations, one association will do well for the taluka.

59809. If necessary, more *kamgars* could be appointed?—Yes.

59810. *Mr. Jamshed Mehta:* You said that the *sowcar* charges thirty-six per cent interest. In your experience, is that the limit?—I have said that the zamindars who have got good credit can get money at twenty-four or twenty-five per cent.

59811. Is thirty-six per cent, the maximum?—It is not the maximum.

59812. What is the maximum?—Fifty or even sixty per cent.

59813. Do you know the co-operative societies for sweepers that have been started in Karachi?—Yes.

59814. What was the rate of interest which the sweepers had to pay before?—I do not know exactly.

59815. Do you know that a census showed that they had to pay one anna to three annas per rupee per month as interest?—I have heard that.

59816. *The Raja of Parlakimedi:* How many agricultural societies pure and simple have you?—Out of nine hundred about eight hundred.

59817. Eight hundred agricultural societies?—Yes. They are agricultural credit societies.

59818. Do they also take up the supply of manures and the supply of proper seed?—They only do credit business.

59819. They do not concern themselves with the improvement of agriculture?—Only in talukas where we have taluka development associations, is the supply of seed, manure and implements, etc., carried on.

59820. There are no separate societies to look after agricultural development?—We have about five or six seed societies in addition to taluka development associations.

59821. They confine themselves entirely to the supply of seed?—Yes.

59822. Nothing else?—No. In two cases, we have started purchase societies. They purchase and supply agricultural necessaries in the taluka. In Tando, Allhyar and Hatri, we have got such societies.

59823. Do they also take up joint sale? Do they collect the produce of the *haris* in the proper season and secure a proper market for it?—No. We contemplate starting such sale societies.

59824. In the seed supply societies, do you not have the *haris* as members?—Yes.

59825. You are satisfied with the work they do to safeguard the interests of the *haris*?—Yes.

(The witness withdrew.)

KHAN BAHADUR NABI BAKSH MUHAMMAD HUSSAIN, M.A., LL.B., Manager, Encumbered Estates in Sind.

Replies to the Questionnaire.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—The agricultural demonstration farms in Sind have not exercised any considerable influence on the practice of the cultivators. The reason for this is that these Government farms are not carried on on commercial lines and have not been paying concerns, whereas the cultivator has to make a living out of agriculture. Unless the cultivator is convinced that a better crop than his own, with a higher yield of profit, can be grown with the same amount of labour and water, demonstration cannot be successful.

Till lately the propaganda work carried on by the Agricultural Department in Sind did not produce any marked results. Since a part of the propaganda work has been entrusted to the Co-operative Department, it has achieved considerable success. The Co-operative Department has done a great deal of work in popularising improved kinds of seeds and ploughs through the taluka development associations.

I would suggest that instead of Government demonstration farms, greater attention may be concentrated on carrying out demonstrations in selected fields of the zamindars themselves, in rotation. The demonstration and propaganda work should be left to taluka development associations which should be formed in every taluka with the co-operation of the Agriculture, Co-operative and Revenue departments. The taluka development associations should be granted some subsidies by Government as well as district local boards.

QUESTION 4.—ADMINISTRATION.—(*c*) (*i*) I am not satisfied with the Agricultural and Veterinary services in Sind from the agricultural standpoint. In my answer to the previous question I have already indicated the shortcomings of the Agricultural Department so far as the demonstration and propaganda work is concerned. The department has failed to arouse public enthusiasm and to reach the public.

The veterinary dispensaries in the Province are few and far between. A larger number of such dispensaries and travelling veterinary graduates is needed.

(*ii*) A greater expansion of feeder railways in the Province is very necessary.

(*iii*) Roads in Sind, with a few exceptions, are in a bad condition, and some are almost impassable during a certain portion of the year. Consequently there is great difficulty of transport in the Province. Better main and arterial roads are needed.

(*v*) A greater expansion of postal facilities in the Province is needed.

QUESTION 5.—FINANCE.—(*a*) Short-term credit is sufficiently well catered for by the co-operative societies and district co-operative banks. An expansion of co-operative societies is necessary to cope with the demand for short-term credit and to eliminate the village *bania;* but so far as long-term credit is concerned, introduction of land mortgage banks seems to be the only solution.

(*b*) Cultivators generally avail themselves of Government *taccavi* both for improvements and buying seed and no further inducement appears to be necessary, except that there may be greater promptness and fewer formalities in granting these loans.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—(*a*) (*i*) The main causes of borrowing are:—(1) Capricious inundation, (2) illiteracy, (3) unbusiness-like habits and want of method, (4) expenses of ceremonies, (5) difficulty in selling produce at proper rates in reasonable time to pay off the Government assessment, and (6) purchase of seed at high prices.

(*ii*) The sources of credit:—At present the *bania* moneylender is the only principal source of credit.

(*iii*) The reasons preventing repayments are:—(1) Inability of the zamindar and the tenant to face a bad season without further borrowing, (2) want of method in liquidating debts, (3) high interest, and (4) dishonesty of moneylenders.

(*b*) In my opinion, to lighten agriculture's burden of debt, there are four remedies:—(1) Improvement in the agriculturist, (2) improvement in the civil law, (3) check on the moneylenders, and (4) creation of facilities for supplying credit to the agriculturist and thus making him independent of the moneylender.

It is often alleged that the zamindars incur debts owing to reckless extravagance. This epithet of extravagance may justly be applied to about ten per cent; the remaining ninety per cent lead a very simple life, their standard of living being very moderate. Their indebtedness is chiefly due to bad seasons which make them responsible for the debts of their *haris*, defective water supply, difficulty in selling grain, buying all commodities on credit at high prices, and expenses on ceremonies, coupled with the fact when once an agriculturist gets into the clutches of a moneylender he is exploited so mercilessly that the debt goes on piling up without any chance of freedom. To improve the zamindar, dissemination of education among that class of people is very essential.

It is an axiomatic truth that the judicial system introduced by the British Government has been entirely favourable to the moneylender at ruinous cost of the cultivator. It is a notorious fact that there was no agricultural indebtedness in Sind during the Mahommedan rule. Mahommedan law did not favour the moneylender. Even the Hindu law of debtor and creditor was very mild. According to Jagannath (Colebrook's Digest), except as regards dishonest debtors, lenient rules were prevalent. A respectable man was to be released on promise, confirmed by an oath, that he would pay up when his resources enabled him to do so. Even a *Sudra* was entitled to the benefit of this rule. A debtor whose inability to pay was caused by a calamity was allowed to discharge the debt in small instalments according to his means. If he was quite indigent, the creditor was obliged to give him a further sum and from the gains he made thereby he was to pay back the old and the new debt. Confinement in a civil jail was unknown under the Mahratta Government, while, owing to the feeling of the permanent connection between the family and the estate, enforced sale of land was never restored to as a means of satisfying a creditor's demands. The facilities afforded by the British civil courts for recovery of debts, enforced sale of land in execution of decrees and the admirable opportunities that the civil law affords to the strong intellect for cheating and deluding the weaker has stimulated the moneylender to lend freely and without restriction. The superimposition of the European forms of law of debtor and creditor on Indian society, not yet ripe for them, has wrought great havoc. Some relief has been afforded to the agriculturists by the Sind Encumbered Estates Act and the Deccan Agriculturists' Relief Act in this Province and by similar enactments in other parts of India. But more is still needed. Since India is mainly an agricultural country, the happiness and contentment of the agricultural population should be the chief care of Government. Unfortunately this has not been the case so far. Acting on the well-known juridical maxim: "The greatest good of the greatest number," Government ought to afford special legal protection to agriculturists. There should be special courts to deal with agricultural indebtedness. Land should not be sold in execution of decrees and debts should be repayable in small instalments.

The rapacity of the moneylender who has sucked the life blood of the agricultural population by high interest, false accounts, inflated claims, deceit and fraud should be checked by special laws such as:—

(1) Legislation prescribing the maximum rate of interest which a moneylender can charge an agriculturist.

(2) Section 302 (*a*) of the German Penal Code—" Whoever, taking undue advantage of the distress, simplicity or inexperience of another, makes to that other a money loan and in virtue of such loan obtains material advantages which, considering the circumstances of the case, are extraordinarily disproportionate to the service rendered, shall be punished as a usurer with imprisonment, which may extend to six months and also with fine not exceeding M. 150."

The Court may also sentence the accused to loss of civil rights.

(3) An enactment making it compulsory upon moneylenders to maintain proper business books.

We have precedents for this in France, Italy, Spain, Russia, Germany, Austria and Greece.

In those countries, the moneylender must keep a day book, letter file, balance sheet showing complete assets, the debts due to and by him, with the value of each debt. The day book and balance sheet register must be permanently bound books, paged, initialled and sealed each year by the Commercial Court or the local Mayor. If these regulations are necessary in Europe, they are far more necessary in a country where the agriculturist cannot read or write and keeps no private accounts.

(4) An enactment similar to the Punjab Restriction of Alienation Act.

In Tsarist Russia Jews were prohibited from acquiring land, while in Russian Turkistan Hindu moneylenders were subjected to a similar disability. Considering the large amount of agricultural land that has passed from the hands of agriculturists to those of moneylenders since the advent of British rule, an enactment like this is very essential for the preservation of the agriculturists and zamindars.

The fourth aspect of the remedy lies in supplying facilities for credit to the agriculturists in the shape of—(1) Land mortgage banks, (2) co-operative supply societies, and (3) co-operative societies for the purchase of produce.

In very few cases does the *bania* restrict his business to moneylending only, except *sowcars* in large towns. The village moneylender, who is the chief source of credit of the rural population, deals also in provisions, stores, cloth and grain for seed and is thus able to supply all the wants of his clients. He can feed them until harvest time, clothe them, advance them seed, grain, or cash for the purchase of cattle and other necessities. He charges a very exorbitant price for the commodities sold and piles heavy interest thereon. Every moneylender is a grain dealer also and acts as a middleman in disposing of the zamindar's produce. He purchases the grain from the zamindar at a very low value and cheats him in weighment also. While the land mortgage banks will save the agriculturist from the clutches of big moneylenders, supply and purchase societies should save him from the two-sided ruin which the village moneylender causes him.

I think the Usurious Loans Act of 1918 may be made generally applicable throughout India. It should further be so amended as to bring it in line with the English Moneylenders Act of 1900 (63 and 64 Vic., Ch. 51) so that a borrower can also apply for relief; and proviso (*i*) to section 3 (1) may be deleted. This proviso considerably retards the beneficial effects of the Act. I would further suggest that an enactment like this can better be administered by courts in sympathy with agriculturists than by the existing civil courts whose sympathies for moneylenders are well known.

In my opinion, it should be the function of the land mortgage banks to facilitate redemption of mortgages.

(*c*) I have already indicated that an enactment similar to the Punjab Restriction of Alienation Act is very necessary to preserve the landholder.

Non-terminable mortgages must be prohibited.

QUESTION 11.—CROPS.—Apart from improvements in crops by the introduction of better agricultural methods, use of suitable manures and fertilisers, a marked improvement in existing crops can be achieved by supplying zamindars and *haris* with pure and selected seed of the principal crops grown.

Co-operative seed supply societies are a great necessity for this purpose. The actual work of distribution should be done by these societies, while the Agricultural Department should be charged with the duty of supplying pure seeds to such societies.

QUESTION 14.—IMPLEMENTS.—There is plenty of room for replacing the ordinary cumbrous Sindhi plough and introducing suitable implements and machinery. The taluka development associations have already done much to introduce improved forms of ploughs. Further propaganda to popularise this work should be left to such associations.

QUESTION 17.—AGRICULTURAL INDUSTRIES.—(*a*) An average cultivator works out on his holding for about 180 days. The rest of the time he generally idles, or employs in carting or cutting fuel and selling it or migrating to large towns to work as a manual labourer.

(*b*) Only such subsidiary industries will succeed as are suitable to the temperament and nature of the agricultural population. Weaving and poultry breeding might be successful in Sind. Government may open rural weaving classes and also encourage poultry breeding.

(*c*) Bee-keeping is unknown in Sind. Poultry are reared spasmodically but not systematically or scientifically. Fruit-growing is not possible owing to lack of irrigation for eight months in the year in rural Sind.

Sericulture is not possible owing to rigour of climate.

Pisciculture is out of question owing to abundance of fish everywhere in Sind and owing to the fact that a large number of the population namely the Muhanas already subsist on it.

Lac culture is possible up to a certain limit only, as the number of trees in arable fields is not very large.

Rope-making is done to some extent already.

Basket-making is also done already.

The obstacles in the way of any subsidiary industry fall under two heads:—(1) lack of initiative, and (2) lack of money.

(*d*) I think emphatically yes.

(*e*) I am doubtful of this in Sind because there are not very many industrial concerns in Sind.

(*f*) Yes.

(*g*) Beyond the stimulating of subsidiary industries, I cannot suggest any other measures for more extensive rural employment.

(*h*) By propaganda.

QUESTION 20.—MARKETING.—(*a*) and (*b*) There are no markets in the proper sense of the word. There are buying centres in large towns where a zamindar sends his produce for sale, but the majority of the zamindars and the entire mass of *haris* generally sell their produce locally to the village *bania*. Every moneylender is an extensive grain dealer also, and acts as a middleman in disposing of the zamindar's produce. Owing to the necessity for cash at the time of the assessment collections, far more grain is put on the market than there is a demand for, and the zamindars often have the greatest difficulty in obtaining proper prices for their grain, if the rates are low, unless the *bania* as a speculation buys up the grain cheaply. To escape all the worry and trouble over assessment, the zamindars frequently obtain money by selling their produce in advance, stipulating to deliver grain for a low price, thereby avoiding the embarrassment of having to sell their grain in a flooded market. The profits made by the *bania* are large, as he has simply to hold out until seed time, when the rate rises automatically and he can sell back to the same zamindars at twenty per cent profit, and often higher, the same grain which he purchased from them six months previously.

(*d*) Yes. I think co-operative grain purchase societies ought to eliminate the *bania*.

QUESTION 22.—CO-OPERATION.—(*a*) (*i*) State aid to co-operation should be limited to—(1) propaganda, (2) organisation, (3) finance, and (4) audit.

(*ii*) Non-official agencies can best encourage co-operation by—(1) propaganda, and (2) education.

(*b*) So far as Sind is concerned, the development of co-operation has taken place mainly on the credit side and credit societies are doing very well. I think the development of co-operation on the non-credit side is very essential. The formation of grain-purchasing, seed supplying and distribution societies is very essential to free the peasantry from the clutches of the *banias*.

QUESTION 23.—GENERAL EDUCATION.—(*a*) In my opinion, the present form of (*i*) higher or collegiate, (*ii*) middle school and (*iii*) elementary school education is completely divorced from agriculture. It has not in any way improved the agricultural efficiency of the people; on the contrary it has had an adverse effect thereon. A farmer's son who has managed to pass the vernacular school final examination looks upon the profession of his father with disdain.

(*b*) (*i*) Unless rural education is so modified as to make a farmer's son a better farmer, it cannot improve the ability and culture of agriculturists while retaining their interest in the land.

(*ii*) Compulsory education is only now being introduced. Unless it is altered as shown in my preceding answer it cannot benefit the agriculturists.

(*iii*) They are called away to help their parents in their work.

QUESTION 24.—ATTRACTING CAPITAL.—(*a*) In my opinion, capitalists do not take to agriculture because they do not possess the requisite knowledge or have sufficient interest in it.

(*b*) (1) Want of initiative, (2) lack of capital.

QUESTION 25.—WELFARE OF RURAL POPULATION.—(*a*) Apart from the economic uplift of the agriculturist, I think rural welfare may be developed on the following lines:—(1) Provision of more dispensaries or travelling doctors, (2) inculcation of sanitary habits among the people by propaganda, lectures, and lantern slides, (3) supply of pure drinking water, and (4) spread of education.

QUESTION 26.—STATISTICS.—(*a*) (*ii*) In my opinion the estimates of the yields of agricultural produce in Sind are not satisfactory. I think it should be made compulsory on every revenue officer from the sub-divisional officer down to the *tapedar* to be present every year at the actual division of produce between zamindars and *haris* in typical villages in rotation and to keep an accurate account thereof.

Oral Evidence.

59826. *The Chairman :* Khan Bahadur Nabi Baksh Muhammad Hussain, you are Manager of Encumbered Estates in Sind?—Yes.

59827. You have sent a note of the evidence which you wish to put before the Commission; do you desire to add anything to it now?—Nothing.

59828. Before I turn to your own particular responsibilities, I should like you to tell me what contribution you think the co-operative movement is making towards the welfare of the countryside?—I have nothing to do with co-operation.

59829. But in your experience, has the co-operative movement made an important contribution towards the welfare of the countryside?—It has.

59830. Is it sound in your judgment?—So far as small men are concerned, it is; it has not yet touched the big zamindars.

59831. Have you many members of co-operative societies whose estates you manage under the Encumbered Estates Act?—Some come under my protection.

59832. Is it within your power to encourage the spread of the movement so far as the lands within your jurisdiction go?—Not with regard to those.

59833. What are the circumstances which bring estates within your control?—When a man is in debt and threatened with the sale of his lands he comes to me.

59834. On whose motion?—On his own motion.

59835. Invariably?—Invariably he has to make the application himself.

59836. In the case of minors, do the courts move?—In the case of minors also, either the Collector moves or his relations; and then the Commissioner has got the power to decide.

59837. Has an application to be made to the courts in the case of minors? —No; in the case of minors their relations can make an application directly to the Commissioner or to me.

59838. Could you give the Commission, shortly, the extent of your responsibility towards the estates when they come under your charge?—The first thing is to publish a notification asking claimants to put in their claims, and as soon as those claims are received, hearings are fixed. I have to go into the history of every claim, not as a civil court, but as a court of equity; I have to go beyond the bounds of the civil court and documents and see what the actual debt is and then award the claim. Then I have to manage the lands; I lease them by public auction. Out of the income realised, first I take the management charges which come to about seven per cent now, and out of the remaining give one-third to the zamindar for his maintenance and then the rest goes for liquidation of debts.

59839. Generally you do not manage the lands?—Generally we lease them.

59840. For what period, on an average, is the estate in your hands?—Some for two years, some for three years, and some even up to twenty years.

59841. From the point of view of agricultural improvement, is it true that on the technical side you have no opportunity to encourage it?—Yes. Generally we give to lessees. Direct management by the department is not possible because the Province is big and there are many estates to manage.

59842. Have you estates in charge of your department within the area which will be irrigated by the Barrage scheme?—Yes.

59843. Does that raise any problem so far as your own responsibility is concerned?—Not yet.

59844. Do you find yourself in a position in which it is your duty to say to the lessee: "I think you are mismanaging the technical side. This or that practice is better than that which you are carrying out at present?"— If it is departmentally managed, there might be leakage of the produce. From the economic point of view it is better to lease the estate to the highest bidder at the auction. We guard against wilful deterioration of lands.

59845. So far as agricultural matters are concerned do you administer in any case?—No.

59846. Agricultural problems as such do not come before you at all?—No; they do not.

59847. What has been your experience of the Agricultural Department?—I have been an officer in the Revenue Department, and as a Revenue Department officer I have come into contact with the Agricultural Department, and I think it is a very good department.

59848. How long have you come into contact with the Agricultural Department?—For the last eighteen years.

59849. I do not know how long you have been in charge of the Encumbered Estates?—For four years.

59850. You still come into contact with the work of the Agricultural Department?—Yes.

59851. Has it improved since you first came into contact with it?—It is gradually improving.

59852. In what has it failed in the main?—In the main, on the demonstration side. The demonstrations do not arouse any enthusiasm in the public at large. It is only after the taluka development associations came into being that the public have come to realise the value of the researches of the Agricultural Department. The demonstrations are not carried out on economic lines. The Agricultural Department do not know what they spend and what they realise. The agriculturist finds that he will have to spend a good deal more than he actually gets; he is never able to make the initial outlay on the scale Government are able to make, nor can he afford to employ the staff that Government employ.

59853. One more question about your own particular responsibility. Do you as a department lend money?—Never.

59854. *Sir Thomas Middleton:* I am not quite clear as to what you do for the landowner; is any landowner at liberty to apply to you?—One who pays more than three hundred rupees as annual assessment.

59855. And you, on the other hand, are able to refuse to take up his affairs or to accept the charge of his affairs?—I have to make a recommendation, and it is for the Commissioner to decide.

59856. Your management is exclusively financial; you look after his accounts?—More or less, exclusively financial.

59857. I do not quite see, if the technical management is bad, how your financial management can assist him?—It is generally indebtedness that drives these people into debt, and not any defect in the technical management; technical management has nothing to do with it.

59858. Then, their difficulties arise from improvident borrowing and such things?—Yes.

59859. You endeavour to reduce the rate of interest that he has to pay?—I think we have reduced it very much. I have got a statement prepared of what the department has done ever since it was formed, and I can show it. In the first year, interest was reduced from ten lakhs to four lakhs.

59860. What percentage of landholders has come under your department?—So far, there have been twelve hundred estates from the beginning of the department.

59861. What percentage do they form of the landholders of Sind?—It means that almost all the big landholders have been through it once or more.

59862. You are looking after the financial affairs of nearly all the zamindars of Sind?—Most of them have been through it.

59863. *Dr. Hyder:* What is the total amount of assessments paid of over three hundred rupees?—I cannot say exactly; about one thousand I think.

59864. You have had more than twelve hundred estates?—Yes; from the beginning, in serial order, up to date there have been twelve hundred estates.

59865. *Sir Thomas Middleton:* Your criticism of the Agricultural Department is from the financial point of view?—Yes, of course.

59866. You think that they themselves would be encumbered estates if they had not Government at their back?—I think so; I have not the least doubt about it.

59867. *Mr. Calvert:* What exactly is it that you do which a private firm could not do?—I have got the power to enquire into the claims just like a civil court; a private firm cannot do that; I can even go beyond the civil courts.

59868. Can they not do that under the Usurious Loans Act?—No. Here the debtor has no power to apply for relief.

59869. Is not the Usurious Loans Act applicable to Sind?—Under section 2 of the English Act a debtor can apply for relief. It is not possible under the Usurious Loans Act.

The Chairman: Have you seen the amendment of the Act?

59870. *Dr. Hyder:* You quote in your note the German Penal Code. Where did you get it from?—From the *Encyclopædia Britannica.*

59871. *Professor Gangulee:* Have you been able to effect any agricultural improvement in any of these twelve hundred estates which have passed through your hands?—Agriculture does not come within our control. These estates are well looked after; they are not worse than they were under the zamindars; in some cases they are even better; the lessee who gets a long-term lease does better.

59872. You state that the judicial system, as introduced by the British Government, has been entirely favourable to the moneylender at the ruinous cost of the cultivator. So far as Sind is concerned the cultivator is the *hari;* are you referring to him when you say "cultivator"?—The *hari* as well as the zamindar.

59873. You say that the zamindar is at the mercy of this judicial system?—Yes.

59874. Have you any views as to the changes to be introduced?—I have suggested the establishment of special courts to deal with agricultural indebtedness.

59875. Do you think that the Deccan Agriculturists' Relief Act and the Encumbered Estates Act have not functioned successfully?—They have functioned, but not successfully. The Deccan Agriculturists' Relief Act is generally administered by the civil courts. I do not think proper remedies have been applied. In most cases the decrees against the cultivator are obtained *ex parte,* and in other cases it ends in compromise. If you see the records you will see very few cases which were decided under the exact provisions of the Act.

59876. You state that expenses on ceremonies is one of the causes of agricultural indebtedness?—I say reckless extravagance; ceremonies everybody has to go through.

59877. To what extent is the extravagance of the people in matters of ceremonies responsible for the indebtedness?—Not to a very large extent.

59878. *Mr. Kamat:* In the case of the Deccan Agriculturists' Relief Act, have you not heard of a large number of cases where instalments are decreed?—I am not talking of the Presidency proper; I am talking of Sind; here the relief is not so very good as it ought to be. Generally they end in compromises; very few cases are decided under the Act finally.

59879. The instalment system is enforced very rarely?—Yes.

59880. In that case, it is not the fault of the Act, but the fault of the administration?—I have stated that it is the fault of the administration, and therefore I advocate that there should be special courts; you require courts of equity, not courts of justice.

59881. But under the Deccan Agriculturists' Relief Act, the courts are empowered to fall back on equity?—But the courts have urban training.

59882. Would you have a Moneylenders Act for the whole of the Presidency?—Yes.

59883. On the lines of the English Act?—Not on the lines of the English Act. The Indian Usurious Loans Act is already based on the English Moneylender's Act. I want an Act whereby moneylenders would be compelled to keep proper books and accounts.

59884. You know that in the Punjab a similar enactment was passed by the Legislative Council?—I have read about that, but I have not been able to get a copy of it. There was a movement of that kind, but I do not know exactly what it was.

59885. The Bill was passed by the Council there; I think it was a non-official Bill; it was not given sanction by Government, but Government promised to draft a similar Bill and look into the question?—I think it will be very interesting if it is done in the case of Bombay too.

59886. A similar enactment for Bombay?—I cannot say a similar enactment, but an enactment to make it necessary to keep sealed *bandis*, so that they may not be tampered with.

59887. In that case, what would be the highest rate of interest in your opinion chargeable by the *sowcar*?—At present it is nothing less than twenty-four per cent, and if you calculate the deductions made on account of the method of account keeping, it will come to thirty per cent. I think eighteen per cent should be the highest rate.

59888. In case such an Act were passed, do you think the present *bania* would try to get round the enactment?—They always try to get round it, and I think law-breakers will find means to break the law.

59889. How do you prevent it at present?—At present when a document is written for Rs. 10,000, it is generally the case that they deduct the interest for one year (Rs. 2,500) and give only Rs. 7,500. So if the examination of accounts from the beginning is done, true things will be revealed.

59890. In such a case how would the zamindar prove his claim? What is the use of such an Act?—Special courts of equity should be set up for dealing with agricultural indebtedness. As I said, I do not look to the document only; it may be for a lakh of rupees, but I will award only Rs. 1,000, if that is the real debt. The remedy for agricultural indebtedness is to set up special courts of equity.

59891. And to pass a Moneylenders Act?—Yes, and a Moneylenders Act. The enactment should be administered by courts which have got a bias towards the agriculturists

59892. Your courts should have a bias towards the agriculturists?—By bias I mean sympathy; the courts would have sympathy with the agriculturists.

59893. *Mr. Jamshed Mehta:* You just now mentioned that you had very little to do with agriculture and you only looked after the finances. Do you not see that the lands are properly cultivated by the lessees?—Yes. We see that lands are not damaged.

59894. You mentioned that you would look to equity, and when there was a debt on a document for one lakh you would award only Rs. 1,000?—If that is the true debt.

59895. That means that you want to take indefinite powers, powers beyond those enjoyed by any court of justice?—It is not any extraordinary power. Ordinary civil courts are courts of justice only. Such powers are enjoyed by all courts of equity.

59896. Have you ever found that some zamindars take very unfair advantage of the Encumbered Estates Act to avoid paying *bonâ fide* debts?—They cannot avoid *bonâ fide* debts; it can be found from the books whether the debts are *bonâ fide* or not. When we take over estates, we take good care to see that the zamindars' intentions are good. For instance, if a zamindar

is a zamindar and merchant combined, and has lost money as a merchant, then we do not take his estates under management.

59897. I am not talking of a combined merchant and zamindar; I am talking of the pure zamindar?—If the debts are *bonâ fide* they will be paid by us for him; there is no fear of the creditor losing genuine debts. When large claims are pressed on the zamindar and his lands are to be sold for execution of civil court decrees, when his debts are too heavy so that he cannot discharge them, then he comes to us.

(The witness withdrew.)

KHAN BAHADUR GULMAHOMED ABDUR RAHMAN,
Acting Deputy Director of Agriculture, Sind.

Replies to the Questionnaire.

QUESTION 1.—RESEARCH.—(*a*) (*i*) Two years ago not much could have been said in this direction though a small beginning had been made on the Mirpurkhas farm in 1922 by the appointment of a Cotton Breeder. The want has however since been partly met in the shape of the establishment of a farm at Sakrand in the Indus Left Bank Circle. At this station agricultural problems which will crop up under post-Barrage conditions four years hence are designed to be investigated. These problems in brief are:—

(1) The testing of the Baker-Lane Scheme of eighty-one per cent intensity of cropping. In this cropping two-thirds of the area will be under *rabi* wheat and one-third will be under *kharif* or hot weather crops.

(2) Finding out the requirement of irrigation water of a crop.

(3) To see the effect of perennial irrigation on the soil.

Provision has yet to be made as recommended by the Committee of 1924 for two more research stations, one in the Indus Right Bank area and the other in the Eastern Nara tract for work on an extensive scale, on rice, *dubari* (double cropping), *jowari*, wheat, etc.

QUESTION 2.—AGRICULTURAL EDUCATION.—It is not possible to deal with the questions under this head given in the Questionnaire because no agricultural school exists in Sind. I therefore confine my remarks to a general note for the information of the Commission.

The problem of agricultural education had been engaging the attention of the department since 1910, but it was not until 1912 that the scheme of opening an agricultural school at Mirpurkhas materialised.

The school commenced with a suitable programme of work, calculated to impart a fair elementary education, both theoretical and practical. It was a one-year course only. Arrangements with regard to the boarding, lodging and tuition of the students were duly made, but with all that the attendance began falling off from year to year, till after about ten years of its struggling existence, the school had to be closed down.

The experience of ten years' working of the school showed that the right class of boys had not patronised the institution; while those who came had probably three objects in view, *viz.*:—

(1) to educate themselves free by securing a scholarship of Rs. 14 per month;

(2) to claim a grant of agricultural land on the strength of this education; and, finally,

(3) to get some kind of job.

The majority of them, however, failed to achieve their object, with the result that future recruitment was adversely affected.

The latest development in connection with agricultural education is the introduction by the Education Department of agricultural bias schools. There are now six such schools in Sind but, being yet in an experimental stage, nothing can be said about them.

Whatever be the fate of these primary schools, I feel that they do not solve the problem of imparting real education to landholders, whether large or small, under the peculiar conditions of Sind. Something different from what we have been actually following is required in order to touch the real agricultural community as a whole.

Under the present arrangement the majority of the boys receiving agricultural teaching are either of the *hari* class possessing no land of their

own or are the sons of very small landholders who do not depend for their living upon the land. The natural consequence of this is that the knowledge they gain is not directly taken advantage of by being applied to the land. After passing the prescribed test they will either be recruited as teachers or will seek some other kind of Government job. Thus a very small fraction of them, if any, might return to the land.

The type of instruction should be such as, apart from estate management and the teaching of technical processes in the field, to teach the boy account-keeping, so that after the completion of the instruction he should feel himself fit only for land work and not for any Government job. The tendency to seek Government jobs is very strong in Sind, as is recognised on all hands, and unless we change this by our method of education we can, I feel, never succeed in making them turn their agricultural knowledge to useful account.

In this connection I had drawn up an elaborate note on the basis of an outline by my predecessor Mr. T. F. Main for the information of the Committee which had met in 1920 with the Commissioner in Sind as Chairman. In this note while pointing out various difficulties in making education accessible to the zamindar class, I had recommended the following type of school:—

(*a*) An agricultural school which should be definitely zamindari;
(*b*) should be really local;
(*c*) should teach the principles of scientific agriculture in all its bearings;
(*d*) should give the boys a fair general education with a fair knowledge of English, especially colloquial, and account-keeping;
(*e*) should give a thorough training in estate management on its business side.

This note was accepted by the Committee in the following words:—

"As regards the second main question, that of agricultural education, the Committee feels that some remarks are required to explain the reasons which underlie their resolution on the second subject of the agenda. In the first place the Committee feels that agricultural schools must definitely be, at least for the present, intended for the sons of zamindars who are substantial or fairly substantial landholders. The class corresponding to the *khatedars* in the Presidency does not exist, except in rare instances, in Sind; and there will be little use in establishing agricultural schools for the sons of *haris*. The only existing school of the kind, that at Mirpurkhas, has not been very successful, partly because zamindars of the agricultural type dislike sending their sons to a distance, and partly because they have regarded the sending of their sons to the school as rather a favour on their part to meet the importunity or desire of their local officers, and a favour for which they expect some recompense, generally in the form of a grant of land either to the pupil or to the parent who has sent him. The latter idea is, of course, absolutely fatal to the permanent success of any such school, but it can be best counteracted by proving to the zamindar that the school is of real use to the boys who go there. The Committee thinks that the most legitimate inducement is the undertaking to impart a knowledge of simple English to the boys. The zamindars are now very anxious for their sons to learn English; this may be due partly to the desire to add to their dignity by raising them above the common herd, partly with an idea of coping more successfully with minor officials, but probably chiefly to a vague but not ill-founded feeling that English would be an advantage to a man in the general development going on throughout the country. In any case the Committee thinks that the teaching of English in these schools will be perfectly legitimate, because a really useful inducement to offer.

As regards locality, it would be undoubtedly desirable to have a school in each district, where the boy would not be too far from his home and where the zamindar would occasionally visit him. But that is not yet possible. In the meantime the Committee recommends a school at Ruk, which would be

convenient for the three districts of Sukkur, Larkana and Upper Sind Frontier, and another at the existing school at Mirpurkhas which would be convenient for Hyderabad and Thar-Parkar, and not too far from at least some portions of Karachi and Nawabshah.

While the Committee cannot recommend agricultural school for *haris'* sons, they think that it might be possible to give some simple agricultural training in *Mullas'* schools, as the Committee understands that *mullas* are eager to be trained in simple methods of teaching and most of the *mullas* themselves come from local cultivators' families. In their resolution on Subject III the Committee has considered that the experiment of closing elementary schools in village areas during the busiest agricultural season should be tried. This may remove something of the present excuses (founded on real hardships) advanced by *haris* for not sending their children to school."

Nothing however came of this scheme. The school I propose should be self-contained. A 100-acre farm would be sufficient to deal with field and fodder crops, animal husbandry and dairying, with vegetable and fruit gardening. A small dairy herd could be attached to the estate for the supply of milk and butter to the colony and also for imparting practical instructions in animal husbandry. A Veterinary Assistant should be in charge of this section to look after the health of the livestock and give lectures in veterinary practice and stock-management. A Hospital Assistant looking after the health of the students could give lectures on sanitary principles and rural hygiene. These two medical sections will be desirable in order to make the institute attractive and create in the students' mind a favourable impression which may lead them to utilise these two departments for the benefit of the village community in their life's career as heads of the village. Such an institution should turn out a class of men who would look after their estates on the right lines. The cost of such an institution may come to a lakh of rupees, but if it is desired that agricultural education should reach the real agriculturist of which the number in Sind is as high as eighty per cent, it is, in my humble opinion, the only method and is one on which no amount of expenditure should be grudged.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(*a*) Before describing the measures which have proved successful in influencing cultivators, I consider it important to discuss briefly the conditions of the mass of the agricultural population with which we have to deal. The Province of Sind comprises a fairly large number of big estates whose owners, either as tribal heads or as powerful neighbours, wield a considerable influence on the petty "*khatedars*" and their *haris* (tenants).

The tenant class, which is by far the largest class of agriculturists, is entirely dependent upon the landlord not only for the seed and other agricultural requisites, but also for its very maintenance. Therefore our demonstration and propaganda, chiefly consisting of popularising improved seeds and implements, has been directed to influencing the landlords of the tract, and recently through co-operative societies and taluka development associations.

1. The propaganda consists chiefly of village to village demonstration of improved implements which are invariably worked with village bullocks in the presence of gatherings of cultivators and zamindars. Improved seeds are introduced by sowing a small area on the zamindar's holding under the local system of farming, and improved methods of cultivation are taught by employing trained coolies to attend to the operations. In the Jamrao tract where immediate cash payment entailed hardship, improved implements were advanced with the concurrence of the revenue authorities as *taccavi* loans. The result of all this propaganda has been that the "Sarkar" plough which is a modification of the Egyptian plough is universally adopted in some districts and on account of the heavy demand it is now locally manufactured in thousands annually. Similarly the hand archimedian screw, the imitation Meston and other light iron ploughs of local manufacture are on the market and are being used to some extent.

2. Ploughing zamindari lands on the hire system is another important feature of propaganda by which the *haris* (tenants), encouraged by their landlords, are trained in their own surroundings in the actual handling of improved implements. The charges claimed for such operations are nominal (Re. 1 to Rs. 2 per acre).

3. Small sub-stations or demonstration plots have also served a useful purpose in popularising improved seeds and implements. Of these, Jamesabad and Nawabshah sub-stations established in the newly colonised tracts have served as mediums to the new entrants to land business for copying the improved methods of farming. The essential feature of management of these sub-stations is that they are run on zamindari lines.

4. Apart from the village to village demonstrations, agricultural shows are periodically organised, when demonstrations of improved implements and machines prove educative.

5. Awarding of *afrin-namas*, medals or certificates of merit during district durbars also stimulate zeal in agricultural classes for departmental "stock-in-trade"; such rewards and recognition in open Durbars create much interest and healthy competition.

6. Periodical publication of leaflets containing agricultural matters of importance, experimental results and crop treatments and their free distribution among the educated agriculturists is another move, although such literature has not proved very effective among illiterate cultivators.

Owing to shortage of staff, however, a good deal of the country has yet to be touched on the above lines. Under the new development scheme, the number of scholarships has been increased from 2 to 6 and it is hoped that in due course the strength of the staff will be sufficiently increased to cope with the present as well as future propaganda work.

(*b*) The effectiveness of field demonstration can be increased by following the methods detailed below:—

(*i*) Our district demonstrators should be of the right class of men, drawn mainly from the agricultural class.

(*ii*) The agricultural officer guiding the demonstration should be courteous, of winning manners and should understand the needs of the zamindars.

(*iii*) The present propaganda staff, which is extremely small, should be increased several fold.

(*iv*) There should be closer co-operation of the Revenue and Irrigation Departments with the Agricultural Department.

(*c*) Cultivators can be induced to adopt expert advice by—

(*i*) giving them improved strains of seeds and improved implements of practical value, on credit or in place of *taccavi*, or at concession prices if in cash;

(*ii*) giving rewards, medals, titles or *afrin-namas* to those who adopt the superior methods or help in introducing them among others, according to the value of the help rendered;

(*iii*) giving land extensions to those who take to improved methods but such extensions should invariably be made at the recommendation of the Agricultural Department.

QUESTION 4.—ADMINISTRATION.—(*c*) (*ii*) The services rendered by railways and steamers are fairly satisfactory to the agriculturist but railways should be extended in rural tracts. The present freight rates could with advantage both to the railways and to the agriculturist be reduced. I know of several places, where alternative transport facilities exist, where agricultural produce is often transported in boats or bullock-carts rather than by rail or steamer. Such transport exists between Jacobabad and Shikarpur, Sukkur and Shikarpur and the Punjab and Sukkur.

(*iii*) In my opinion, the number of roads is insufficient and where roads exist their condition is unsatisfactory. Owing to the alluvial nature of the

tract even the existing modest vehicular traffic cuts the roads badly, with the result that they become very dusty. This is not only a hindrance to mechanical transport but retards the expeditious transport of produce and causes rapid wearing of vehicles. Moreover, during the inundation season certain roads remain under water for a long time.

(*iv*) Any forecast that the meteorologist could make regarding the weather, if circulated forthwith in the country, would be very much appreciated.

QUESTION 5.—FINANCE.—(*b*) The following measures would induce cultivators to make fuller use of the system of *taccavi*:—

(1) The rate of interest charged on *taccavi* advances should be reduced to correspond with what is paid by Government to the public, to which cost of establishment may, if necessary, be added.

(2) *Taccavi* rules should be sufficiently relaxed to enable the legitimate demands of the cultivator to be fully met.

(3) The disbursement of *taccavi* should be entrusted to senior and vigilant officers.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—(*a*) (*i*) The main causes of borrowing are:—

(1) the inherent poverty of the cultivating class;

(2) accumulation of interest upon interest over a series of years;

(3) the low yield of agriculture, due to lack of resources, yielding barely a living wage;

(4) the necessity for borrowing to obtain seed and livestock for cultivation purpose;

(5) illiteracy and ignorance of accounts;

(6) dependence on, and consequent bondage to, the usurer;

(7) precarious inundation;

(8) to some extent, social customs.

(*ii*) The sources of credit are:—

(1) co-operative societies,

(2) *taccavi* advances,

(3) last, but most important, the village *bania* (moneylender).

(*iii*) Reasons preventing repayment are:—

(1) failure of crops owing to poor or late inundation or wholesale crop pests such as rats on rice, rust in wheat and bollworm in cotton;

(2) mortgage of produce to the village *bania* and consequent low rates accounted for by him and possibly his other extortions.

(*b*) Any measure of legislation to protect the agriculturist debtor from the clutches of the usurers will tend to affect the credit of the cultivator, as has already been the case where land grants have been made under restricted tenure. The only way, in my opinion, of protecting the agriculturist is to introduce compulsory primary education and provide cheap credit through agricultural banks, Government *taccavi* or co-operative societies in such a way as to meet fully the needs of agriculturists for the time being.

QUESTION 7.—FRAGMENTATION OF HOLDINGS.—(*a*) The law of inheritance which is mainly responsible for the fragmentation of holdings should be amended or legislation introduced to prevent holdings from being divided to such an extent as to become uneconomic; that is to say, a minimum limit may be prescribed beyond which no fragmentation is to take place. A change of the law of inheritance may be against the sentiment of the people but I believe the economic pressure which is now being felt on all sides will tend gradually to overcome the feeling.

QUESTION 8.—IRRIGATION.—(*a*) (*i*) A great change is shortly to take place in the Province as the result of the Lloyd Barrage and canals under which

perennial water supply will be guaranteed for the agricultural needs of the tract.

(*iii*) With regard to the non-barrage area, wherever wells are successful they are naturally being developed and some further encouragement in the shape of *taccavi* loans from Government or credit societies will do what is necessary.

(*b*) The present working of the canals and the distribution of water is in certain cases not satisfactory owing, I believe, to the vagaries of the river Indus; this defect cannot be remedied till the Lloyd Barrage is completed.

QUESTION 9.—SOILS.—(*a*) (*ii*) Of the reclamation of *kallar* (alkali) land we have two outstanding instances at Sukkur and Doulatpur, where alkali soils were reclaimed by surface drainage and then continuously cropping them. The work at Doulatpur, however, could not be completed on account of the failure of the Jamrao Canal to meet in full the irrigation demands of the farm.

QUESTION 10.—FERTILISERS.—(*a*) The fallow system of taking a crop from the soil once in three years or more has obviated the necessity for any great use of manure. Rice occupies the largest area (about one million acres) and this has been sown continuously year after year on the same land without manure, except where *dubari* (double cropping) with a pulse crop in the cold weather wherever circumstances permit has been adopted.

(*d*) It is only in scattered areas where intensive cultivation is practised, chiefly in garden crop areas, *e.g.*, the sugarcane and potato tract around Chak in Sukkur district, the Malir tract in Karachi district, the Bhitshah cotton tract in Hyderabad district and the sugarcane areas on the Baghar Canal in the river delta, that the necessity of manure is felt, and the local supply of farmyard manure has been meeting this limited demand. In cotton tracts, however, another source of supply is tapped, namely, the mounds of old village sites, of which Brahminabad, eight miles east of Shahdadpur, taluka is the most conspicuous. There is also a practice of saline efflorescence from "*kallar*" soils or silt from canal banks being applied to cotton fields.

(*f*) Wholesale cowdung-burning is not at all a common practice in Sind as is the case in the upper Provinces. In mosquito-infested localities dry and semi-dry dung is used to smoke off the mosquito to save human beings and cattle against their depredations but the ashes are returned to the manure pit. Cowdung is utilised on a small scale especially to heat milk on a slow fire. Some quantity of dry dung is transported to towns and sold as fuel. I think legislative measures would stop the last practice which is objectionable and is likely to drain off a considerable quantity of useful material from rural tracts. *Hwri* grants allotted as necessary adjuncts to every village will provide cheap fuel and hence are calculated to dissuade the cultivators from using the cowdung for other than manurial purposes.

QUESTION 11.—CROPS.—(*a*) (*i*) Cotton, wheat, rice and *jowar* are the four important staple crops of Sind. The work of improving these is done by seed selection, isolation of superior strains and their maintenance by pure line culture. As regards cotton, of a large number of strains isolated by pure line culture on factors of ginning percentage, yield and earliness, one known as 27 W.N. has proved superior to local varieties and has satisfied the trade and the zamindar alike. It is now maintained in a pure state, by renewal of stock of seed from self-fertilised seed every year. This is carried out and seed multiplied through the departmental agency till the fourth generation when it is distributed in group of villages for further multiplication.

In the case of wheat, the direction the department took in the improvement of local wheats was to have a number of strains with superior characters (of strength, colour, yield, etc.) isolated from local varieties. The most promising that have now been retained are C.P.H. 47, A.T. 38 and G.S. 25. Of the introduced varieties from outside Sind only two, *viz.*, Pusa 12 and Punjab 11, are replacing the local wheats.

Similarly, improved types of rices are being developed by selection from representative local varieties and by testing a number of foreign ones with a view to introducing the most promising types from among them. Attempts

are also being made at crossing local with foreign varieties to produce hybrids of high market qualities and superiority to local varieties as regards yield and early maturity.

(*ii*) During the existence of the department a variety of new crops, including fodder crops, has been tried. Of the fodder crops, *berseem* has come to stay with us permanently. Of the other crops, Egyptian cotton did show promise of success as long as perennial irrigation facilities existed on the Jamrao. Among American cottons, Punjab F4 has proved to be healthy and prolific, fitting in with the present conditions of water supply and possibly other environmental conditions. It has become popular with the growers inasmuch as no less than 36,302 acres were sown with this cotton on the Jamrao Canal in 1926-27 in spite of the water supply being a month-and-a-half later than the proper sowing time. This cotton is, however, a low class one so far as its staple is concerned*; hence it will be desirable to evolve a strain having all ths desirable characteristics of this cotton, but having a superior staple of an inch or more for cultivation under the Barrage.

(*iii*) The zamindar generally depends upon the village *bania* or the *mofussil* merchant for his seed requirements. There is, however, an excellent exception to this rule in a tract called Bhitshah in Hyderabad where the cultivators and merchants co-operate to maintain a pure cotton seed supply of Bhitshah cotton. The state of things with the village *bania* or the town merchant elsewhere is anything but desirable because not only are their stocks of seed hopelessly mixed up, but no less than fifteen per cent of the seed is of low vitality owing to weevilisation, etc. The cultivator is alive to the disadvantages of sowing such seed, but cannot help taking it because of his poverty. The departmental pure seed supply organisation, whether of improved cotton, wheat or rice, though very limited at present, appears to be on right lines and requires developing.

(*c*) *Vide* reply under (*a*) (*ii*) above.

QUESTION 12.—CULTIVATION.—(*i*) One of the main activities of the district staff from almost the commencement of the department in Sind is directed towards introducing improvement in the method of tillage.

The practice of dry ploughing of fields long before the sowing season in order to aerate and enrich the soil has caught on with the cultivator in some progressive tracts as a result of departmental demonstration.

Interculturing cotton, ordinarily done by costly human labour, is now being taken up by progressive zamindars by working the plough in between the crop whether it be drilled or broadcast.

(*ii*) No practice of mixture is generally adopted in Sind in the sense in which it is adopted elsewhere. In cotton the cultivator puts in a sprinkling of *jowar, bajri, maize, til* and *guar* seed to supply him with early fodder for his working cattle.

Rotation.—As the existing irrigation facilities generally admit of one-third of the land being cultivated per annum, the necessity of practising a rotation of crops has not been felt and therefore not practised. Under the improved irrigation conditions, however, it would be necessary to devise a good rotation in which *berseem* should play an important part. This matter would be for the Sakrand farm to investigate.

QUESTION 13.—CROP PROTECTION, INTERNAL AND EXTERNAL.—The seed for the main crops is produced within the Province but large quantities of seed potatoes are imported from Italy as well as from Kalka and Farukhabad, outside Sind. The question of imported disease in this seed does not appear to have arisen.

QUESTION 14.—IMPLEMENTS.—Sind agriculture is very poor in implements both as regards quality and variety. The most successful introductions are light kinds of ploughs such as the Meston and the modification of Egyptian ploughs which are now largely used and manufactured. There is scope for the heavy inverting plough, but as the quality of cattle is too poor to work them effectively they are not being taken up extensively. The tenant or *hari* system and comparatively cheap labour are obstacles in the way of the

* *Vide* note on page 154.

adoption of heavy machinery and labour-saving appliances such as seed drills, reapers, binders and threshers.

I give a list of new implements that are being brought to the notice of the agriculturists:—

(1) Screw water lift.
(2) Leveller.
(3) Jowar stone thresher.
(4) Tractor.
(5) Chaff cutter.
(6) Pumping plant.
(7) Raja, Chattanooga, Oriental and Meston ploughs.

These have in some cases been purchased by zamindars and are in use. Labour-saving appliances have, however, an excellent future under post-barrage conditions when both introduced machinery and that devised by the Mechanical Engineer's department for the needs of the country will play an important part.

QUESTION 15.—VETERINARY.—(*a*) I think it should be under the Director of Agriculture, being more or less an allied subject.

QUESTION 16.—ANIMAL HUSBANDRY.—(*a*) (*i*) Cattle-breeding needs immediate attention because cattle supply the only motive power in the agricultural practice of the Province. There are three excellent breeds of cattle along the borders of Sind:—

(*a*) The red Sindhi or Karachi cattle, recognised as the best milk-producing cow in India.
(*b*) The Thari or Dhatti breed reared in the desert of Thar Parkar and recognised as a dual purpose breed.
(*c*) A third breed consisting of purely draught cattle bred in the desert tract along the river Nari to the north of Upper Sind Frontier district has proved valuable for producing first class heavy bullocks suited to all kinds of farm operations.

These breeds have so far not been developed. A central station for each breed is essential with a view to supplying bulls of first class quality for distribution in the interior of Sind, where the cattle are all nondescript and of poor quality and consequently unfit for working improved agricultural implements.

There is already a farm for the Karachi cattle to supply pedigree bulls to organisations and bodies in towns and rural areas for improvement of milk supply. The other two breeds should similarly have separate breeding stations.

The Thar Parkar or Dhatti breed should have a separate breeding station somewhere at Hyderabad or Tando Mahomedkhan to supply draught animals throughout the Lower and East Sind tract, to which this breed is admirably suited.

The Bhagnari cattle should have a central breeding farm at Jacobabad or Shikarpur to produce acclimatised bulls for Larkana, Sukkur, Upper Sind Frontier districts and Khairpur State.

(*iii*) The system of animal husbandry as carried on in the country is far from satisfactory. The methods of castration of young bulls and selection of sires are either unknown or not followed systematically. Immature bulls of obscure origin being herded with cows at night or allowed in the pastures, the result is nondescript progeny. Therefore, the supply of breeding bulls to villages and castration of all male calves except a few of the promising progeny of these bulls should be the first step. The provision of forage and green fodder in sufficient quantities should be made. During the hot weather grazing in waste or fallow areas is scarce and green fodders are rarely cultivated, with the result that most of the cattle are starved out and have little energy to produce or work. Unfortunately the irrigation conditions are responsible for this shortage of fodder supply.

(*b*) (*iii*) The large percentage of cereal crops cultivated presupposes a sufficiency of dry fodder throughout the Province, but a large quantity is sold off. The cultivator, as a rule, feeds the cattle properly during the busy season only, turning them out to graze in the recently harvested fields and waste lands for the remaining part of the year, with the result that the animals are almost starved out. The pecuniary liabilities of the farmer are the main incentive to the sale of fodder.

(*iv*) In the dry season, December to July, green feed is not available and its absence tells much on the yield of milch cattle.

(*c*) April to June is the period of fodder shortage in the Province. Scarcity of fodder exists for twelve weeks throughout April, May and June. Preliminary flooding takes place in July. After this, young growing cattle begin to thrive on cultivated fodders and grasses which last till October-November.

(*d*) Better facilities for irrigation water will improve fodder supply.

(*e*) 1. For the benefit of village cattle Government should make *huri* grants for the growth of *babul* trees and natural grasses to each village, to be managed by the villagers themselves on the basis of co-operation. Each *huri* may be about ten acres or more, depending upon the size of the village.

2. Breeding bulls from Government cattle stations should be issued *gratis* in the first instance to important villages.

3. Annual cattle exhibitions on a small scale may be held in each taluka, prizes being awarded on the basis of actual performance and constitution.

QUESTION 17.—AGRICULTURAL INDUSTRIES.—(*a*) In places where both *rabi* and *kharif* cultivation is possible, the cultivator has work all the year round; but where there is *kharif* cultivation only he has only six months' work.

In the slack season he—

(1) takes a holiday to attend fairs, of which there is a good number in Sind;

(2) attends religious or social functions in or out of his village;

(3) does carting and camel driving on wages;

(4) is engaged in canal clearance work;

(5) tends his livestock;

(6) works for daily wages on construction works, especially near towns.

(*c*) Extremes of climatic conditions do not favour bee-keeping and sericulture. Poultry rearing is already done on a limited scale. Fruit growing will not be undertaken by the cultivator as he has no permanent interest in the holding, nor are the conditions of water supply favourable. For lac culture and rope making there is some scope and they are practised wherever the necessary material is available. There is no scope for pisciculture as there is already a large quantity of fish available naturally.

(*e*) Wherever there is raw produce, concerns such as ginning factories and rice hulling mills have already established themselves near rural areas and these absorb some of the spare labour. Similarly small flour mills may with advantage be opened in wheat growing tracts.

(*g*) In view of the anticipated agricultural development of Sind due to the Lloyd Barrage, rural population will have sufficient employment in agricultural operations all the year round.

(*h*) Travelling health officers should be appointed whose duty it should be to tour rural areas periodically and lecture on the elements of hygiene.

QUESTION 18.—AGRICULTURAL LABOUR.—(*a*) (*i*) This Province being sparsely populated, there is no need to attract agricultural labour from one area to another.

(*ii*) Large tracts of cultivable land remain uncultivated at present for want of water. When the Barrage is in working order people from congested areas outside Sind will have to be attracted by giving them grants of land,

at concession rates if necessary, as has been done on the newly colonised area of the Jamrao and Nasrat Canals.

(*b*) The causes of the shortage of labour are:—

(1) The naturally thin population though it is sufficient for the present needs of cultivation.

(2) Want of extended irrigation facilities.

(*c*) There is no surplus population in Sind at present.

QUESTION 20.—MARKETING.—(*a*) and (*b*) There are no regular markets in the sense in which they exist elsewhere but there are trade markets which appear to suit the *mofussil* growers. These trade markets are adequate as regards *bonâ fide* transactions and the zamindar who is not in debt generally secures fair terms. This is particularly true of the Jamrao, Tando Adam and Shahdadpur cotton tracts. The existence of ginning factories belonging to several responsible firms like those of Ralli Brothers, Volkart Brothers and Indian firms, is a fair guarantee of fair values being obtained. The ginning factories give reasonable conveniences to the growers in the disposal of their produce; they have their brokers who arrange sales even on the grower's estate and supply empty *bardans* (gunnies). There is also a system of forward sale when they get about Rs. 2 after every *maund* of *phuttis* offered at a critical time.

As to wheat, European exporting firms like Ralli and Volkart Brothers have their sub-agencies at principal centres like Sukkur, Shikarpur and Larkana where they either purchase from big zamindars direct or through the local traders. The prices offered are generally satisfactory. The position of the small grower is different; he disposes of his produce to the village *bania* who offers him much lower rates.

The rice market is controlled by local capitalists who have their rice hulling mills amidst rice growing tracts and this trade is so much localised that while there is no difficulty in its marketing, prices may not always be fixed on considerations of supply and demand. Should rice factories combine, which they sometimes find expedient for their mutual good, paddy, being unfinished produce, has no market beyond the walls of these rice mills. Now, owing to the increased number of rice mills, (within the past eight years the number of these in Larkana has risen from forty to fifty-four) this tendency is slowly dying out. These trade markets cannot be called very satisfactory and the *mofussil* cultivators will not be benefited unless we have a chain of markets scattered over the rural areas. This is not practicable at present for want of better roads and feeder lines.

(*c*) Grading and packing of agricultural produce both for foreign and Indian markets are matters requiring serious attention. The grading should be standardised in order to maintain the quality. This should be done by legislation.

(*d*) Yes.

QUESTION 22.—CO-OPERATION.—(*a*) I think non-official agencies will be more effective in the spread of the co-operative movement.

(*b*) The number of credit societies has in the last few years increased by leaps and bounds but societies mentioned in items (*ii*) to (*ix*) have not, with two exceptions, been organised. I think all these societies are very necessary to enable increased credit to be employed in the best possible way and should receive attention.

QUESTION 23.—GENERAL EDUCATION.—(*i*) and (*ii*) I have tried to give a comprehensive scheme with regard to agricultural education under Question 2 above.

(*iii*) With regard to (*a*) (*iii*) a few agricultural bias schools have been recently started by the Educational Department but they are still in an experimental stage. But even if these become successful I do not think they will in any way benefit the agriculturist to any desirable extent.

(*b*) (*i*) Agricultural middle schools as proposed by me appear to me the only way of improving the ability and culture of the zamindari class while retaining their interest in the land.

QUESTION 24.—ATTRACTING CAPITAL.—(*a*) There are the following factors which frighten the capitalist from taking to agriculture:—

(1) The dull life of the country.

(2) Precarious seasons.

Notwithstanding this, the advantages of bringing the capitalist or enterprising man to the land are so many that every effort should be made by propaganda to attract him to the land. In my opinion, this will naturally come about with the prospect of guaranteed water supply under the Barrage.

(*b*) The factor which discourages the zemindar from carrying out improvements on his lands is want of capital; hence long-term credit at low interest should be given.

QUESTION 26.—STATISTICS.—For want of the necessary staff, this is not being done by the local Agricultural Department. The figures of cultivation are communicated by the Revenue Department direct to the Director of Agriculture, Bombay Presidency, Poona. To my mind, they are not accurate and reach the public too late when published. It is, however, important that this should be done by the local Agricultural Department and for this additional staff will be necessary.

Oral Evidence.

59898. *The Chairman :* Khan Bahadur Gulmahomed Abdur Rahman, you are Acting Deputy Director of Agriculture in Sind?—Yes.

59899. We have your note of evidence; do you wish to add anything to it at this stage?—No.

59900. Would you give the Commission some account of your own past appointments and experience?—I have twenty-three years' service now in the Agricultural Department. I have had no collegiate education, but I was the first man to be taken up in the department when the department was started in Sind in 1905. Since then I have studied the subject of agriculture in the course of my service.

59901. The whole of your service has been in Sind?—Yes.

59902. Have you ever attended at Poona?—I have gone there two or three times to attend some conferences; but otherwise I have all the time been in Sind.

59903. Then, have you acquired your agricultural knowledge in the course of your service, or have you attended any courses?—I received practical training in the early days of my service from the then Deputy Director of Agriculture, Mr. Fletcher, and I have acquired further knowledge during the course of my service.

59904. But, strictly speaking, you have no scientific qualifications?—No.

59905. What is your responsibility towards the research station at Sakrand; have you any responsibility?—No; I have no connection with it; it is directly under the Director of Agriculture.

59906. Is any research being carried on directly under you?—There are three farms in which research work is going on, but that work is in charge of a committee. This committee sits three times in the year to see the progress being made; and I am on that committee.

59907. Between the meetings which are held three times a year, you are expected to see that the work at these three farms is carried on within the policy laid down by the committee, is that so?—Yes.

59908. Are the three stations which you mention doing work which is largely preparatory to the extension of the Barrage irrigation in Sind?—No; that work is being carried on at Sakrand.

59909. Entirely?—Yes.

59910. What work are you doing in these three farms?—We work for the improvement of the main varieties of rice, wheat and cotton. That work is being done and the seed is multiplied from year to year.

59911. How much land is there in Sind under cultivation which is not irrigated in any manner whatsoever?—I cannot tell you; I do not remember the figure, but it is a good bit.

59912. One does not expect people to carry the figures in their head; is it an important area?—It is.

59913. What attention has your department given to cultivation of land of that sort?—That land is lying waste because of want of water. Until irrigational facilities are given it cannot be cultivated.

59914. There is no cultivation on that land?—That is so.

59915. Cultivation without irrigation is impossible in Sind?—Yes.

59916. Does that apply to the whole of Sind?—Yes, except to the desert portion of Thar Parkar district.

59917. Is the cultivation carried on there dependent upon the rainfall?—Yes, as also a good bit of Karachi district which gets a little rain.

59918. Has your department contributed anything important to dry cultivation in Sind?—There is already some dry cultivation in northern Sind, where wheat is grown without irrigation. First the land is flooded and the seed sown; after that it does not receive irrigation. We have improved that cultivation to some extent. Beyond that we have done nothing.

59919. In answer to Question 2, on agricultural education, you describe the history of the agricultural school at Mirpurkhas; is that still in being?—No.

59920. At what age did the boys attend that school?—From twelve years upwards to fifteen.

59921. Do you believe in teaching practical agriculture to boys of that age?—Certainly, from twelve to fifteen, that is the proper age to teach practical agriculture.

59922. How about the expense; can you remember at all how much it cost to educate each boy at that school?—We used to give them some scholarships of twelve rupees a month; we gave them free quarters and then there was some other contingent expenditure.

59923. Do you recollect the cost per boy?—It came in all to about eighteen rupees to twenty rupees per month per boy.

59924. Is that for the whole year or for the term?—No, per month.

59925. Per month for those months in which the boys attended school?—Yes.

59926. How about the type of boy that was attracted by that school?—We did not get the sons of agriculturists; boys came whose object was to get some service.

59927. To get jobs?—Yes.

59928. Did you teach English there?—No.

59929. Has the Agricultural Department as such any connection with these agricultural bias schools of which you say there are now six?—Yes, there are six and we have a connection with them.

59930. What exactly is it?—So far as laying out of the farms for them is concerned, and then just visiting the schools two or three times a year to see what progress they are making; but the administrative control is in the hands of the local boards.

59931. How about the school masters who are responsible for working these firms?—They have a training for six months at Lyallpur in the Punjab, and when they return they are directly employed by the district local boards for teaching the agricultural subjects in the school. We are simply an advisory body; we hold their annual examination and advise them on agricultural matters.

59932. Are these six schools Government schools?—No, they are local board schools.

59933. At what age do the boys leave?—We generally teach agriculture in the senior standards from the fifth to the seventh; in those standards we find boys of thirteen to eighteen or something like that; we do not teach agriculture in the junior standards.

59934. Are they conducted more or less on the Punjab model?—I cannot say; I have no idea of the Punjab model; but these are the schools which exist in Bombay Presidency also; they were started three or four years ago and in Sind also they have existed for the last three years.

59935. Have you intimate knowledge of the working of these schools?—Yes.

59936. Do many cultivators' sons go through these courses?—Very few of them; the large percentage is of other boys.

59937. What is their idea in going through the agricultural course?—They are simply studying in this school, and as this class has been introduced, they have to learn that, but they are not specialising.

59938. With no idea of taking up agriculture; is that so?—Yes.

59939. What does the practical training amount to?—They have a small farm of about an acre or so attached to each of them.

59940. One pair of bullocks?—One or two schools have their own bullocks but other schools hire bullocks, and as the area is generally small, about

an acre or so sometimes, the work is done by the boys themselves, whether it is digging or interculturing. Whenever they have to do ploughing, of course, they buy or hire bullocks.

59941. Do you know how many hours a week are given to practical farming?—I think three times a week for about an hour and a half.

59942. But you sum up, I think, by suggesting that the system in Sind is not working satisfactorily because the right type of boy is not receiving agricultural education at this moment; is that your view?—Yes.

59943. Can you suggest any remedy for that?—I suggested a type of middle school, a special type of school.

59944. Are you thinking of teaching English at these schools which you recommend?—Yes, in order to attract boys of the real agricultural class.

59945. Is it any good trying to keep boys on the land by refusing to teach them English?—I do not think so.

59946. If an English education is what they want, they will go elsewhere for it; is that the point?—Yes, English should be taught in a direct method, colloquial English, so that they can speak in English.

59947. Talking about agricultural propaganda, the Commission has heard a certain amount of criticism of the department in Sind on the ground that in the past it has not on its demonstration side been equal to its opportunities; do you agree with that criticism?—Yes there has been criticism, because we have not been able to touch the whole tract for want of staff; we have had no staff. It is only in the last two or three years that we have been getting boys from the college who are coming up. Formerly we had only a handful of men and we could not tackle the whole Province of Sind. It is only in places where we concentrated that we have done really useful work. That has been the cry of the previous Deputy Directors who were my predecessors, that the staff should be increased.

59948. How about your methods of demonstration; do you depend upon your demonstration farms, or are you demonstrating on the cultivators' own holdings?—I have described fully in my written evidence the method we employ in demonstrating our implements and seeds. We have demonstration plots which are worked by the *hari* system which is the usual system here in Sind, so that that might appeal to the zamindar instead of employing any hired labour or keeping any elaborate staff on it. At the same time, when we give out any new seed to any man, of course he becomes conversant with it on the demonstration plots; then we just show that seed side by side with his own seed on his land so that he may see the effect of it and compare it with his own seed.

59949. Where land is cultivated on behalf of the department by *haris*, are they paying a rent in the ordinary way?—No, they generally give over some piece of land just to sow the seed there.

59950. Have you also an arrangement by which land, the property of the department, is cultivated by *haris* for the department, as it were?—Yes, we have; at the present moment we have a large area of 400 or 500 acres which is being cultivated by means of *haris* where we multiply seed.

59951. That is what I want to know about; in that case are the *haris* farming on a commercial basis?—Exactly on a commercial basis.

59952. Are they getting any manures from you?—No; of course here there is no necessity for manure. As a matter of fact, we have to leave one-third of the area uncultivated for want of sufficient water, and as such lands lie fallow, they regain their fertility.

59953. What I want to know is whether these *haris* are getting from you anything in the way of credit or advance or anything else, which they would not naturally get if they were the tenants of ordinary zamindars?—They were the tenants of ordinary zamindars first, but they are now working with us, with the result that they are getting much better produce than they were getting before.

59954. Are they enjoying any advantages now that they are your tenants which they did not enjoy when they were the tenants of zamindars?—Yes.

59955. What?—The advantage is this, that they are getting more produce out of the land by getting better seed.

59956. That is an advantage from better cultivation, but are they getting any advantages in terms of, for instance, cheap cartage or free cartage, bullocks at an advantageous price or anything of that sort?—No, they are getting the advantage of two things: better seed and better cultivation.

59957. And nothing else at all?—Nothing else at all. We give them an advance without any interest and we recover at the harvest time; but we chiefly employ them on cultivation work; we do not get any other work from them as zamindars generally do.

59958. Their produce is for distribution as improved seed?—Yes.

59959. How do you pay them for their produce?—In the case of lift irrigation we take one-third and give them two-thirds of the produce, and in the case of flow we get one-half.

59960. You are on the *batai* system which is general in Sind?—Yes.

59961. Do they get an improved price for their share of the improved variety seed?—Yes, they get from twelve annas to one rupee more per *maund*.

59962. They sell for seed as well, do they?—Yes.

59963. You see, I am trying to reconcile your note with what has been suggested by more than one witness, namely, that where the department fail in Sind is in their lack of demonstration under cultivators' conditions?—There is no doubt that we have had failures in the past, but at the same time we have succeeded where we have adopted the proper method of demonstration. The only thing is that whenever a cultivator went to an experimental farm, of course he got prejudiced; but that we could not help; we never invited him to see anything there because that was simply an experiment going on.

59964. Is the demand for improved seed active?—It is very active.

59965. Can you meet it?—No, we cannot sufficiently meet it.

59966. Do you hope to meet it in the future?—Yes, we hope to meet it.

59967. By extending your present organisation?—By extending and by getting better facilities for irrigation.

59968. Have you experimented with a tractor at all?—Yes, we have three tractors at present; one is confined to Sakrand; there are two which are working on farms under me. We have been able to get some figures by which we find we can cultivate an acre of land with an expenditure of about seven rupees.

59969. What depreciation are you allowing?—We allow thirty per cent depreciation in the first year and ten to fifteen per cent in subsequent years.

59970. And interest on capital?—Interest on capital at eight per cent. But there is some difficulty in working these on cultivators' land, because they have very small compartments, whereas a tractor requires a bigger unit of land in order that it may work freely. On the Jamrao Canal they have one-acre plots which they have necessarily to keep under the irrigation rules. On such small fields it is difficult to work tractors; and, besides, they have undergrowth of roots and scrub jungle; that also is a hindrance.

59971. Have you experimented with steam tackle?—No, we have not done that in Sind.

59972. Would not that be a good thing for clearing the scrub jungle?—That I could not say; I have no experience of it.

59973. Have zamindars taken up tractors at all?—One zamindar has purchased one.

59974. When did he purchase?—About a year and a half ago.

59975. What does he say about it now?—He is using it on his land.

59976. Is he happy about it; is he pleased?—He appears to be pleased.

59977. I suppose people who are annoyed with the department tell you about it, while people who are pleased with the department keep quiet: Is that so?—Very often.

59978. No news is good news, is it not?—No, it is not like that. Of course we are in touch with that zamindar who is using the tractor; we are always in touch with him; in fact, we supplied him with the driver in the beginning; if any part goes wrong, we try to have it replaced by ordering it, and any other difficulties which arise we try to solve.

59979. Do you make him a present of all this service and material?—Yes, but of course when we have not got any, we have to order it out for him.

59980. Who found the capital for purchasing it?—Of course the zamindar; we do not pay for it.

59981. I thought you said you helped him out with his repairs?—We help him in getting the parts from the firm at his own expense and give him any other suggestions or any other advice which he requires.

59982. Have you any views about the agricultural statistics in Sind; do you think they are reasonably accurate?—No, I do not think they are reasonably accurate; I have said something in that connection in my note; it is at page 149.

59983. Now I want to turn to another subject. You mention at one point that you do not regard Punjab 4F. cotton as very satisfactory. What is your view about 4F.?—I have said that for the present purpose it is all right; it suits the cultivators and I have said that in the last year we had no less than about forty thousand acres under it.

59984. I see, now that my attention is called to it, that you call it a low class variety; is that what they call it in Lyallpur?—We call it medium variety.

59985. Medium staple cotton?—Yes.

59986. But not a low class variety?—No.

59987. *Sir Thomas Middleton:* You say it is "a low class one so far as its staple is concerned"?—As compared with the long staple.

The Chairman: It may stand if you wish it to.*

59988. *Sir Thomas Middleton:* In 1920 you drew up the scheme for an agricultural school?—Yes.

59989. I do not think that scheme was adopted in any case, was it?—No, it was recommended by the committee which sat to consider this matter as well as the other matter, and it went to Government; since then nothing has been heard about it.

59990. Your main requirements were that it should be definitely zamindari and really local?—Yes.

59991. What do you mean by "really local"?—It should be in as central a place as possible so that it may be convenient for zamindars' sons.

59992. Did you think of it as representing one district in Sind or the whole of Sind?—It should represent, say, one centre of Sind.

59993. So that you contemplated a series of such schools in Sind?—At least three.

59994. How many masters had you in mind?—Four masters: one headmaster with three assistants.

59995. How many boys had you prepared for?—I think about 100.

59996. Did you work out the cost?—No, I did not work out the cost; of course the details have to be worked out, but that was the outline of the scheme.

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* The witness subsequently requested that for the words "a low class one so far as its staple is concerned" the words "a medium stapled one, having a staple of $\frac{7}{8}$" " should be substituted (*vide* page 145, lines 13 and 14).

59997. I saw the outline and it occurred to me the cost might have been the difficulty. It would be a very expensive type of school?—It would be about a lakh of rupees; I do not think it would be more than that.

59998. You were with Mr. Fletcher at the beginning, you tell us?—Yes.

59999. How many years did you cultivate Egyptian cotton with him?—We cultivated it for nearly five years.

60000. Why did it fail finally?—There are different opinions about it; some think the right sort of seed was not tried, but I do not think there is much truth in that because at present one or two varieties which were on trial then are now under trial at Sakrand and they seem to be doing comparatively well. But then water supply was the chief difficulty, because this crop, being a superior crop with a long growing period, required water earlier in the season than we could get it. In the beginning we did get it and it did fairly well, except that we had some difficulty with the cultivators, for it was a newly colonised tract and the people did very rough cultivation. But in spite of that it did well; but afterwards, when the Jamrao Canal failed to supply early water, of course this failed.

60001. Was it a failure on the part of the cotton or was it a failure of water; I have always understood it was failure of water?—Yes, that was it, because we could not get an early supply of water in order to have it ready by October before we get any frost or dewfalls.

60002. Do you know what types Mr. Fletcher imported?—Yes, Mettaffifi, Abbasi and Ashmouni.

60003. I think you said just now that you still have some of that seed?—Ashmouni we have at present; it is doing better than the others.

60004. Is it a new importation or the old seed?—A new importation.

60005. What is this 27 W. N. cotton?—That is a strain from the ordinary local cotton, which, when it is examined, is found to have four types. We selected this and gave it the name 27 W. N.; it is a white flowered ordinary *neglectum roseum* cotton. This we have selected; we are multiplying it and it is very popular.

60006. From your account I gather that the cattle of Sind are poor?—No, they are not; we have the best breeds here.

60007. I was not thinking of the Karachi and Thar Parkar breeds, but the ordinary cattle?—Yes, very poor.

60008. The number of these selected breeds which you refer to, the Karachi and Thar Parkar, is small, is it not?—Karachi cattle are small in size, but the Thar Parkar is of medium size.

60009. I mean, the total number in the country is not large at present?—The total number is small; it is not very large.

60010. Most of the cattle consist of ordinary draught animals; I think you call them Bhagnari?—Bhagnari are confined to the northern part of the Province; but they have been bred for size and the present size is not suitable for agricultural purposes because they were bred for military transport purposes.

60011. Then they are like the Hissar breed and that sort. Have you seen Kankreji cattle?—Yes.

60012. Are they like the Kankreji in size?—No, they are bigger than that, very bulky and heavily made.

60013. If you go to the district in which the Thar Parkar are bred, do you find in that district only pure Thar Parkar or are they mixed?—The cattle are mixed; they are non descript cattle at present.

60014. Do any of the zamindars maintain herds of pure Thar Parkar?—No, not pure.

60015. Are the only pure herds to be found on Government farms?—No, we have no farm except the farm for the Karachi cattle here; but we do come across a bullock here and there which may correspond to pure type.

60016. But that you can only guess at by its appearance?—Yes.

60017. So that the Karachi cattle are the only pure types in Sind that you can be sure of?—Yes.

60018. The Thar Parkar cattle are all mixed?—Yes.

60019. What is the usual age of castration for draught bullocks in Sind?—As a rule they do not do castration, but the age limit is about a year or two.

60020. I ask what the common practice is. Take the big breed that you referred to, the Bhagnari, what do you say the age is?—The same.

60021. Are you sure?—I am not quite sure, but that is my impression.

60022. *Sir James MacKenna:* What was your appointment before you took over the Acting Deputy Directorship?—I was first a fieldman; after four years I was appointed Inspector, and after four or five years Divisional Superintendent. I held that appointment for about ten years, and then I was appointed Acting Deputy Director.

60023. Have you ever done any crop selection and research work yourself?—Not myself independently, but I have worked in a committee.

60024. And you are to see that the work approved by the committee is carried out properly?—Yes.

60025. You do not live on the farm?—No. As Deputy Director of Agriculture, I live at Karachi; the headquarters are at Karachi.

60026. The Superintendent is on the farm?—Yes.

60027. *Professor Gangulee:* Who draws up the plan of experiments?—It is at present done by a committee consisting of the Director of Agriculture, the Botanist or Cotton Breeder, and myself.

60028. Do you find that such plans require to be revised occasionally?—An experiment, when once laid down, is carried on for a number of years, till we get definite results, and those results are repeated till we get final results.

60029. Are you familiar with the Sakrand station?—Yes, I know Sakrand.

60030. Do you think that the schemes which you now have for that station require to be revised in the light of new experience that you have gained?—I do not think so, because they have only recently been laid down, and they will have to be proceeded with for a number of years.

60031. Do you think that the Baker-Lane scheme requires revision?—If it is suggested by the experiments, then it might require revision. The scheme that has been laid down is not considered to be unsound, but the cropping is such as to need a considerable amount of farmyard manure, and to replace that, perhaps some leguminous crops will be needed to come between the other crops.

60032. Can you tell the Commission a little more about the reasons for the failure of the Mirpurkhas school?—The reason was that we did not get the right kind of boys.

60033. And the right method of teaching?—It was elementary teaching, and that was done by a graduate of the Agricultural College. So, there was no defect in the teaching; there was defect in the recruitment.

60034. What was the qualification for admittance?—A boy who had passed the vernacular fourth or fifth standard was admitted.

60035. If you had to start that school again, would you change the qualification for admittance?—In order to induce the boys to come, we might keep the same qualification as I have suggested for the school which has been proposed by me.

60036. What steps would you take to reduce the risks of failure?—We might provide English education as an attraction for boys of the zamindari class to come and join. That is the chief attraction that we shall have to provide there.

60037. It will be definitely zamindari?—That is what I have suggested, and that has been approved of by the committee also.

60038. In the memorandum that was submitted to us by the Bombay Government, I find that in Karachi there is a distinct decrease in the net cropped area. The net cropped area of Karachi has receded recently quite conspicuously, and there is a fall in production to the extent of twenty-three per cent. Can you tell the Commission why it should be so?—I cannot tell you with certainty, but probably water supply may be at the bottom of it.

60039. A fall in production to the extent of twenty-three per cent is a big fall?—It is a big fall, no doubt.

60040. You consider water supply is one of the reasons?—That is what I think. It cannot be over-cropping because the water is not sufficient for even one-third of the holdings at present.

60041. You have explained to us why experiments with Egyptian cotton failed. Do I understand that you have abandoned the experiments with Egyptian cotton?—Yes, till we get stable conditions, a steady and perennial supply of water.

60042. When the Barrage and canals are completed, perhaps you will continue the experiments?—Yes, certainly. In fact, experiments have been begun even now at Sakrand. With the perennial supply which is now available there, the experiments have been begun again.

60043. With Egyptian cotton?—Yes, even with Egyptian cotton from this year.

60044. With fresh seed from Egypt?—Yes.

60045. You told us that you were carrying on experiments with the new variety of Egyptian cotton known as Ashmouni?—That is being done at Sakrand.

60046. Are you trying any other variety?—Sakel, Pilion and Zagora are the three varieties that are being tried.

60047. To what extent is Pusa 12 wheat being grown?—To the extent of fifty thousand acres. It is mostly confined to North Sind, in Sukkur, the Upper Sind Frontier, and Larkana districts.

60048. Do you think the area could be still further extended?—It is being extended.

60049. The difficulty is perhaps a steady supply of water?—Yes.

60050. The cultivator is quite convinced of the benefit?—He is very much convinced.

60051. With regard to the question of seed supply, do you find the taluka develompent association of help in your district?—It is of very great help, because it is through the medium of these associations that we are able to find a ready response from cultivators, and we are able to distribute our seeds and implements through them.

60052. The seed is grown on the farm under your supervision?—Yes.

60053. Will you take the Commission through the process?—We grow a certain quantity in our farm, then we give it out to private seed growers, then we collect it and give it out further. We handle it to, say, about twenty-five to thirty thousand acres. Further, it multiplies itself, and we cannot follow it because it becomes too unwieldy for the department to follow.

60054. The private seed growers grow under your supervision?—Yes; we supervise their crop.

60055. Do you renew the strain?—Every year we are renewing; that process is continued.

60056. What prospect do you hold out for *berseem*?—At present there are no prospects for it, but when we can have a cold weather supply of water, there will be much scope for it.

60057. The extension of *berseem* cultivation would solve, to a great extent, the fodder problem?—Certainly, it must.

60058. Talking about the fodder question, do you think cattle-breeding pays in Sind?—My information is that it does not pay.

60059. You have a certain amount of export demand from Karachi?—Yes; there is any amount of demand.

60060. In spite of the high prices that you get from the export market, cattle-breeding does not pay?—In what sense?

60061. I am referring to cattle-breeding as is conducted by private persons?—To those who are near towns it pays very well, because they can find ready sale for their milk and other produce, especially milk; whereas, those who are far away from towns do not get any ready sale for their milk, and consequently it does not pay them as well as it perhaps does in other countries.

60062. Do you think the Government of Bombay have paid adequate attention to cattle-breeding?—They have, in so far as one station has recently been established near Karachi, and they have three or four stations in the Presidency proper.

60063. What are the chief difficulties in the way of cattle improvement?—The chief difficulties are that the ordinary breeder does not understand the principles of breeding; that is because he has no knowledge. That is the chief difficulty.

60064. Has he convenient access to good stud bulls?—Wherever Government institutions have been established, they have free access to them.

60065. In the experiments that are being conducted by you, are you doing anything with regard to rotation of crops?—We did carry it out in the beginning, when the Jamrao Canal worked well. That was designed to be a perennial canal, and in the beginning, for a few years we did carry it out, but before our results were out and could be called definite, the water supply failed, and so we discontinued it.

60066. Are you working out any other scheme?—Not at present, but it is being worked out at Sakrand, where the Barrage conditions have been reproduced.

60067. About water supply in Sind, what, do you think, would be the state of affairs in non-barrage tracts? Do you think they will have enough water for agricultural purposes?—I do not see any reason why they should not have enough water. Of course, they will have water for a certain season, for about four or five months in the year in the hot weather, but I do not think it will be a steady supply.

60068. What about well irrigation? Is there any possibility for well irrigation in any tracts?—Certainly, it is possible, and there are wells on which cultivation is being done. It is mostly confined to the north of Hyderabad.

60069. You think that non-official agencies would be more effective in the spread of the co-operative movement?—Yes, because private individuals command more confidence.

60070. Do you see signs of such bodies coming forward?—I do.

60071. *Mr. Kamat:* Has there been mooted in this Province an idea to have an Agricultural College for Sind?—Yes, there has been some such movement.

60072. A first grade Agricultural College?—Of the type of Lyallpur or Poona, a full-fledged college.

60073. Is the demand for it universal?—There is a demand from certain sections of the people, but I do not think it is universal. So far as the land-owning community is concerned, I do not think they understand it, or that there is any demand for it from them. There is a demand from certain sections of the people.

60074. If it is not from the zamindars, from whom is it?—From certain sections of the people; probably the townspeople and a few zamindars; there is no demand from the large majority of zamindars.

60075. What is your own view?—I do not think it is necessary to have a college for Sind, because those who are turned out by the college generally seek jobs. We can give them jobs only to a very limited extent; so far as the department is concerned, they could employ a few. I am for schools

of the type that I have suggested, so that the agricultural community as a whole may be benefited by it.

60076. What is the type you have suggested?—I have suggested a middle school in my note.

60077. A prominent feature of agriculture in this Province is that land, some thousands of acres in extent, is accumulated in the hands of some zamindars, whereas the large bulk of the *haris* are landless. That is the situation?—Yes.

60078. Do you think that is desirable?—It is not very desirable.

60079. Would you like to have a change in favour of the *haris*?—If you take away the *haris* and give them lands individually, then perhaps there will be no *haris* available to cultivate the zamindars' lands.

60080. You are not in favour of it?—To some extent, but not as a whole. To some extent you could give out lands to some intelligent *haris*, or to those who show signs of progress, but not as a whole.

60081. Have you thought of any scheme to improve the position of the *haris*, by giving them land under the new Barrage area?—No, I have not. But I think the old plan of giving out the land to Punjab colonists as peasant proprietors of the Jamrao, about thirty-two acres to each man, has worked well and has given good results. But I do not know how far such a holding will be handled by Sindhi *haris* as peasant proprietors. If such lands are given out at all, I think they should be given out under that tenure.

60082. If two blocks of sixteen acres each are given out to the Sindhi *haris*, what difficulties do you foresee? They will not have the capital?—They will not have the capital; they have quite a different mentality. The Sindhi *haris* as a whole are indolent people; that is my personal opinion about them; whereas, the Punjabis have made it a success. They have not only made a decent living out of it, but they have also accumulated sufficient money to buy land from their neighbours, especially from Sindhis.

60083. You cannot depend on the Punjabi to colonise the whole of Sind?—I think the Sindhis have, to some extent, copied them, and probably, under the present economic pressure, things might improve, but not at once.

60084. You think an attempt to improve the *hari* in that direction would not be successful. Is it worth making a beginning at all?—We might select a few *haris* and start an experiment on the lines of the Jamrao, and see how it succeeds, and then we could extend it.

60085. Some such attempt is worth making?—Certainly; I think so.

60086. Are you conversant with the conditions of wheat export from Karachi?—No.

60087. You have not studied the problem of wheat export from Karachi itself?—I know the marketing system which is being carried out in the *mofussil* and elsewhere.

60088. I think you have said something about the marketing conditions?—Yes.

60089. What are the defects, apart from the question of having middlemen?—The defects are that we have at present a very defective road and railway service. We should have many roads and many feeder lines, so that the agricultural commodities could be brought to some central market very easily.

60090. These are the administrative conveniences which you want?—Yes.

60091. Speaking from the agricultural point of view, is there any adulteration either on the part of the producer, or the middlemen, or the Indian firms, or the English firms which export wheat?—I think there is adulteration.

60092. Have you any idea how to prevent the adulteration of wheat?—Wheat is marketed on the basis of a certain quantity of pure wheat and a certain quantity of other foreign grain mixed together. In the case of those who make an attempt to grow a pure crop, their quantity being very small, the trade does not compensate them for the purity of their produce; but if

some legislation is passed fixing the grade of crop, then perhaps adulteration might disappear.

60093. Short of legislation, have you any other method to suggest how to improve conditions? Cannot the department, by propaganda or any other means, do something in the matter?—Yes. For instance, we distribute seeds of Pusa 12, which is quite pure. The produce from that of course is pure, but apart from the quality for which that particular wheat fetches some premium, no consideration is paid by the trade for that commodity being pure. That is the state of affairs; but if a certain standard is fixed, if it is laid down that the zamindars should produce that standard and the trade should pay a certain price for that particular standard, then I think there will be a universal increase in price, and both the zamindar class and the trade will be profited.

60094. If grading or standardisation were to be introduced, do you think the producer would understand it?—I think there are some who do understand it. For instance, in the case of cotton, there are people who mix dry leaves of the cotton plant, or the dry bolls with their cotton deliberately, in order to increase the weight. There are some such dishonest people. They even water their cotton, so as to make it bulky. But there are others who produce it in quite a clean state, but the quantity being small the trade does not pay enough for it; on the other hand, the trade mixes something with it. So that, ultimately, when it goes to its final destination, the thing is very much adulterated through several agencies.

60095. Do you mean to suggest that the exporting firms are not conscious that in the long run that is to their detriment?—That is what I have noticed. I am not talking of big exporting firms, but of village *banias* and such men.

60096. You think that there should be propaganda to educate public opinion with reference to the *banias* and the village people?—Propaganda is already in progress, but the *bania* is only concerned with his profit; he does not care what quality he markets he does not understand it. It is mostly with the growers and with the big firms that some such propaganda should be started; in fact, it has already been started.

60097. When you speak of legislation, on what lines should there be legislation?—So as to fix some grades, say of wheat or cotton; anybody bringing produce of a lower grade than that which is laid down should be dealt with in some way.

60098. Is it something like the Cotton Transport Act?—Something of that kind.

60099. *Mr. Jamshed Mehta:* You were talking about the adulteration of wheat. If a resolution were passed by the merchants' chambers in the ports to which the wheat is exported, say Liverpool or other ports, insisting upon a particular quality of wheat being sent to them by their agents or their own firms here, then the merchants who are buying the wheat, the middlemen, and even the growers would have to give that quality of wheat. Do you not think that would be sufficient without having legislation?—I think there is already a demand for a certain standard in European markets, and those who offer lower standards than that are paid less. This has been going on for several years, and yet it has not remedied that defect.

60100. Do you know that because a certain standard which is not quite pure is accepted by the merchants outside India, therefore the export firms here send out that quality of wheat, making it up by adulteration even if it is given to them pure?—I think so.

60101. You were talking of Sindhi *haris* who are indolent. Do you mean the zamindars or the *haris*?—I am talking of the *haris*.

60102. You think that if land in blocks of sixteen acres were given to them, they would make no use of it?—Our past experience of that experiment which has been carried out on the Jamrao shows that there is some scope for it, but we made the experiment with non-Sindhis. So, I say that it is worth

while making an experiment with Sindhis to begin with. My idea is not to give out all the land at once, but to select a few men, try that experiment with them, and see if they can make a living out of it as the Punjabi men did, with a stable permanent supply of water. If that experiment succeeds, then it is worth while extending it.

60103. Do you think a co-operative society of the *haris* would succeed? Suppose you form a co-operative society, get an area of land, make the *haris* work on it, take payments from them, and within a period of fifteen or twenty years make them the proprietors of that particular block of land, would such a scheme succeed?—It comes to the same thing whether Government or co-operative societies do it.

60104. Do you think that, in such a case, the *haris* would work diligently?—I think it is worth while trying that experiment.

60105. Supposing a choice were given to you between an additional Arts College and an Agricultural College in Sind, which would you prefer? If Government said that they were going to have an Arts College, and if somebody else said that they want an Agricultural College, what would be your opinion?—From the zamindars' point of view, I would not favour any.

60106. If a choice were given to you, what would you do?—If I were a zamindar, I would not favour either of them.

60107. You feel that there will be no jobs available, and therefore you do not want an Agricultural College?—Yes.

60108. In that way, may I just say that the graduates of the Arts College are exactly in the same position? Can we say, therefore, that there should be no Arts College?—It is the wrong kind of education that we are giving them.

60109. You were asked about your experience with tractors. You said there was one at Sakrand and two in your department, and you stated that it costs about seven rupees an acre?—Yes, it costs about seven rupees an acre.

60110. Including depreciation?—Including everything.

60111. How does it compare with the present method?—It does superior work. It goes to a depth of ten inches or so, and it uproots all the weeds. Taking that into consideration, I think it is a good thing.

60112. How does it compare with the present methods in Sind?—With regard to land covered with deep-rooted weeds or dirty land, I think the tractor is cheaper.

60113. What is cheaper?—The tractor, in the case of foul land.

60114. With normal land?—With normal land, our ordinary plough. Our ordinary plough goes only to a depth of four or five inches, but these tractors go to a depth of ten inches. The ordinary plough is not able to work through weeds. Therefore the tractor is the best thing for foul land.

60115. Supposing co-operative societies are formed for the supply of tractors to small holders, the societies could rent them to the members. Would it succeed?—I cannot say until we have completed our experiment.

60116. Has your department tried to rent them?—Yes; recently we rented one to Mr. Madhavdas of Shikarpur who cultivated thirty acres of land.

60117. You speak of attracting capital to land. You have lived all your life in Sind. When the Lloyd Barrage land is free for cultivation, would you be in favour of large syndicates taking up land for cotton, wheat, etcetera?—Yes.

60118. Would you be in favour of granting land to educated young men, either direct or through co-operative societies?—It would be a good thing if we could make them settle on the land and not simply own the land, stay in the towns and depend upon the labourers to cultivate the land.

60119. Do you think educated young men, unlike the *hari*, would put to use modern tractors, etcetera?—It is worth while trying.

60120. Supposing the leaders of any particular community, the Memon community, the Parsi community or the Khoja community, came to you in the interests of the young men of their community, wanting to colonise the land with their young men, would you give them facilities for purchasing land?—Provided the young men undergo training in some form and make themselves fit for farming.

60121. I come now to the question of subsidiary industries. Your opinion is that the agriculturists are free for at least four to five months?—Yes.

60122. One of the zamindar witnesses told us that the agriculturists are not at all free to work on any subsidiary industries; what is your view?—In the case of Upper Sind Frontier where the *bosi* system of cultivation is going on the cultivators have work for eight to ten months in the year.

60123. *Dr. Hyder:* What does *bosi* mean?—A piece of land is flooded in September and the water is allowed to soak into the land to a depth of one foot or more. When the surface water has evaporated the wheat seed is drilled in and it grows without further irrigation. That is *bosi*.

60124. Who is the *hari* who adopts this *bosi* system?—The same *hari* who takes up *kharif* cultivation.

60125. *Mr. Jamshed Mehta:* Do you think if the Department of Industries demonstrates certain subsidiary industries to the *hari*, the *hari* will take them up?—I have said that there is not as much scope for these industries in this tract as elsewhere, because the *haris* have got plenty of work if they choose to work.

60126. If experiments are made and demonstration given to them?—Experiments with what?

60127. Small industries, such as those mentioned in the Questionnaire, rope making, weaving?—I do not think they will take up weaving, because they have a prejudice against it.

60128. In which tract do you say the *hari* has enough work to do?—Where *bosi* cultivation is taken up. There they have work for eight or nine months in the year. Here, in Lower Sind, they are busy for six months in the year. Conditions vary; wherever there is water and scope for wheat cultivation, there the *haris* remain engaged for eight months; where there is only ordinary *kharif* cultivation they are engaged only for six months in the fields.

60129. Do you expect labour shortage after the Barrage is completed?—Yes.

60130. And you will have to employ labour-saving implements?—Yes.

60131. On the question of fodder, you say that there is scarcity of fodder during certain months. One of the witnesses stated that there was no scarcity of fodder. What is your experience?—There are some tracts in which there is no scarcity, but taking Sind as a whole there is scarcity during certain months.

60132. In the Presidency they have a scheme for preserving large quantities of fodder; would that be suitable to Sind?—I do not think there is scope for any such thing in Sind. We have got irrigation here and although it is not steady, all the same it gives a sufficient quantity of water to enable the cultivator to grow grass if he chooses to grow it.

60133. On page 146 you give some advice regarding the supply of breeding bulls, weeding out and castration. Do you think that if the Veterinary Department were placed under the Agricultural Department it would work better?—I have stated in my note that the Veterinary Department should be under the Director of Agriculture.

60134. On page 143 you say that compulsory primary education would be the best means of freeing the zamindars from debt. So, in your opinion, as they get educated they do not get into debt?—That is what I believe.

60135. On the other hand, some witnesses have stated that if you gave education there would be no *haris* on the land?—I do not mean education up to the seventh standard; I mean compulsory primary education.

60136. How would you prevent them from going to the upper classes?—The *mulla* schools which have been recently started are the best; they would give them just sufficient knowledge for their own use.

60137. On page 143 you make a statement that *taccavi* rules should be entrusted for administration to more vigilant officers; is there anything wrong at present?—I do not say there is anything wrong; if the officer is vigilant the turn-over will be quicker.

60138. Water distribution is at present in the hands of the irrigation engineers. Some witnesses have stated that it should be entrusted to the zamindars, because they say that the irrigation officers who are mere engineers do not know anything about agriculture and the water requirements of crops and soils. Do the engineers consult the Agricultural Department in any way when they have to give water?—They do not as a rule. They supply a certain quantity of water laid down in the rules. Possibly the difficulty is due to deficiency in the river itself.

60139. It is alleged by the zamindars that they have no knowledge of the requirements of a particular crop or soil; I therefore want to know whether you would wish that the Agricultural Department should be consulted in fixing the quantity of water, or whether you would wish the distribution of water to be entirely entrusted to zamindars?—I think it should be entrusted to a board consisting of the representatives of zamindars, the Agricultural Department and the Irrigation Department.

60140. You state, on page 142, that you have not sufficient staff for carrying on your work in Sind. What staff would you want?—Several more; something like fifty or sixty, and even a hundred when the Barrage is in working condition.

60141. Without that staff Sind would suffer?—It would suffer, because our work requires more men.

60142. On page 141 you speak of agriculturists being entirely dependent on zamindars. What does the agriculturist or *hari* get from the zamindar? Out of the half share of the produce that the *hari* ought to get, what does he actually get?—There are certain deductions on account of expenses in connection with charity.

60143. The zamindar deducts a share for charity out of the *hari's* share?—Yes, but it is not very appreciable.

60144. Can you give the Commission an idea of what the *hari* makes per month?—He gets his proper share *minus* something deducted for giving charity. What he gets depends upon the nature of the crop; if the crop is good he will get more; if the crop is bad he will get less.

60145. What does he get per acre?—In the case of cotton, if the yield is eight *maunds* per acre, he will get four *maunds*.

60146. There is no deduction?—There is some deduction. The practice differs from place to place; some zamindars give away the whole share; some deduct a small share.

60147. *Professor Gangulee:* Could you give us an idea of the income and expenditure of the average *hari*?—That depends upon the nature of the tract, the water supply and so on. Assuming cotton to be the crop, at the present rate of twelve rupees per *maund* (last year the prices had gone down), allowing ten acres for one *hari*, I think he ought to get about one hundred and fifty to two hundred rupees, assuming conditions to be normal.

60148. Have any attempts been made by your department to take a census of his income?—That is an economic study; we study that.

60149. *Mr. Jamshed Mehta:* On page 141 of your note you make the statement that an agricultural school should be started for zamindars' sons and not for *haris'* sons; why not?—Because the *haris* have not got their own land and therefore they would not be interested in that sort of school, where management and all that sort of thing will be taught. You must remember that the *hari* has no interest in the land and therefore that sort of education will not help him much.

60150. Is it your idea that, for generations to come, he must remain a *hari*?—If he raises himself, he can take his place among the zamindars; there are *haris* who have become zamindars.

60151. On page 139 you mention the failure of an agricultural school; when was it in existence?—About five years back.

60152. Do you think that if one were started even now it would be a failure?—I am not speaking of that type. Even the agricultural bias schools in existence are not successful because the pupils who study in those schools are not of the agricultural class.

60153. *The Raja of Parlakimedi:* In demonstration, may I know what factors you concentrate upon?—Demonstration of seeds, implements and the other departmental things?

60154. When you go about demonstrating the improvement of crops, what factors do you take into consideration?—As regards the improvement of seed, so as to increase the average outturn of the crop, we have taken up cotton, wheat and paddy.

60155. For instance, do you not take into consideration the yield?—Yield as well as quality. We see that the seed we distribute is capable of giving a higher yield and at the same time capable of giving a quality which will command a premium in the market.

60156. To achieve the highest yield, what fertilisers have you been using? —We have not used any fertilisers. In Sind this method is not of a pressing nature, because the lands lie fallow alternately and they get sufficient rest to recoup the lost fertility.

60157. By applying artificial manure, cannot the yield be increased?—It can be, but if you use artificial manure you require facilities for irrigation.

60158. In irrigated tracts are you introducing artificial manures?—We have recently made a start. In co-operation with a private firm we have started distributing these manures.

60159. For what crops have you started giving artificial manures?—Wheat, sugarcane, etcetera.

60160. What fertilisers?—Ammonium sulphate, nitrate of soda; these are the chief.

60161. What steps do you take to make these fertilisers easily accessible to the agriculturists?—A firm in Karachi has organised this; they give easy credits. The department has not given any on its own account. We have induced certain zamindars and other people to go in for these.

60162. Do you take the help of the co-operative societies?—Exactly; we work through the co-operative societies.

60163. On page 142 you mention certain qualifications neecssary to make an officer efficient. Do you not think that it will be better to add to those qualifications "disinterested and zealous personal interest"? You say that he must have winning manners and so on. Do you not think that it is very necessary that the officer should be zealous and also interested in the work he is carrying on?—That is the first requirement.

60164. That should be mentioned first before you say "winning manners"?—I have stated that he should understand the needs and requirements of the zamindars. Unless he is interested how can he understand them?

60165. But that might have been clearly stated?—Yes.

60166. As regards animal husbandry, you suggest that the breeding of dual purpose animals should be encouraged. Would it not be better to have a bull of the pure milking strain and another of the dual purpose strain, so that people who want only dual purpose animals may have the service of that particular bull and people who care for the milking strain may have the service of the bull with the pure milking strain?—In my opinion it would be better to kill two birds with one stone.

60167. You may not reach a good standard of efficiency?—We should try to do it as far as possible.

Khan Bahadur Gulmahomed Abdur Rahman.

60168. In parts of Sind, do not the cattle with heavy milk yield thrive?—They do; the Karachi cow here is well known as the best throughout India.

60169. Do they thrive in all climates?—They seem to be thriving; for instance, they have been sent to Japan.

60170. In Sind itself, in desert areas?—In desert areas or in Upper Sind, I cannot tell you; but round about Karachi and even up to Hyderabad they do very well. Some cows and bulls have been purchased by His Highness the Mir of Khairpur, but I have no information as to how they are getting on.

60171. Are the people in these parts accustomed to grow fodder for their cattle? Do they set apart a portion of their fields to grow fodder?—They do. They grow *bajri*.

60172. Are they in the habit of storing fodder?—They do store it, but not in the form of silage. They put it in a heap and that is enough. We have little rain here.

60173. Does that give them sufficient provision during periods when fodder does not grow in the fields?—Yes; they are safer here than in the Presidency.

60174. When they are so much interested in the cattle, I think there should be no difficulty in breeding a variety which will give a heavy yield of milk?—I have stated that we have an excellent breed in Sind, which is known as the best in India. I have also advocated that breeding stations should be started to improve the Thar Parkar and the Bhagnari breeds.

60175. Has the Thar Parkar breed reached a high standard of milk yield by cross breeding?—We have not done any breeding that way. I have suggested that some stations might be started.

60176. *Mr. Jamshed Mehta:* You say something about research stations in your note; do you think they are immediately necessary?—I do not think they are immediately necessary.

60177. At present the food-crop area is eighty-one per cent. of the total, and the non-food-crops area is nineteen per cent of the total. Do you think that after the Lloyd Barrage comes into operation, those percentages will change?—I think under the Baker-Lane scheme a greater area has been provided for food-crops, so the percentage of food-crops area will increase.

60178. And the other will decrease?—Perhaps so.

60179. *Professor Gangulee:* Then, you do not envisage the extension of cotton cultivation?—The Baker-Lane scheme does not provide for much cotton cultivation.

(The witness withdrew.)

KHAN BAHADUR DILMURADKHAN BAHADURKHAN KHOSO, President, Jacobabad Municipality, and Zamindar, Jacobabad.

Replies to the Questionnaire.

QUESTION 1.—RESEARCH.—(*a*) It should be inquired for what reasons the agricultural state of the Upper Sind Frontier district is backward.

(*i*) In my opinion, the climate of this district (extremely hot in summer and cold in winter) and the scarcity of rains are responsible for this backward condition. This could be remedied by improving canals and thus allowing more water to zamindars.

(*ii*) It has been observed by experience that, every day, disease in the cattle is increasing and some precautions and measures may be taken to remedy it.

(*b*) There is great need for skilful workers and the difficulty of money should be met.

QUESTION 2.—AGRICULTURAL EDUCATION.—(*i*) No.

(*ii*) Yes, it is very necessary to extend teaching facilities in this district.

(*iii*) Yes.

(*iv*) The number of boys in the schools should be increased. To every school a farm should be attached, a portion of the produce of which may be given to the boys.

(*v*) To induce lads to study agriculture, some compensation may be made to them after finishing their course either by giving them employment or giving them land for their maintenance.

(*vi*) Yes.

(*vii*) Agriculturist students should be given much more practical experience than at present.

(*viii*) They are all very neccssary.

(*x*) This could be done by giving them handsome scholarships.

(*xi*) No.

(*xii*) and (*xiii*) This could be done through zamindars who may be helped by Government with money.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—Till there is sufficient education and improvement in the people the Government should show consideration to the agriculturists (*i.e.*, zamindars) in giving out small strips of land, by giving them facilities and conferring honours on them.

QUESTION 4.—ADMINISTRATION.—(*a*) As the climate of every part of the country is different, it will be better to do different work at each place.

(*b*) In my opinion, the work on agricultural implements that is being done now should be continued. The number of people with scientific knowledge should be increased. There should be a board consisting of officials and non-officials under official control.

(*c*) (*i*) and (*ii*) I am satisfied. The improvements have proved useful to the country. Greater attention in this direction will prove more useful.

(*iii*) The condition of roads is bad. No improvement can be made in the present financial position unless Government makes a grant.

QUESTION 5.—FINANCE.—(*a*) It is necessary to give pecuniary help in order to improve cultivation.

(*b*) *Taccavi* allotments and the period for the return of *taccavi* should be increased.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—(*a*) (*i* and *ii*) (1) Heavy expenses, (2) borrowing money at heavy interest, (3) inadequate produce owing to deficiency of water, (4) lack of rainfall and accidents leading to decreased income, (5) the *taccavi* which is given to *haris* is not under proper control

and there is therefore fear of loss, (6) heavy burden of taxes, (7) heavy expenses of excavation and less payment therefor from Government, and (8) hardness of Government in the grant of remissions.

(*b*) (*ix*) The zamindars get less advantage from the purchase and sale of grain than in other countries. The rates of grain vary but zamindars do not know it. There should therefore be fixed rates, for the traders get much profit and the zamindars lose. Action should be taken for the protection of zamindars. By means of Government *taccavi* it should be made easier for co-operative credit societies to obtain loans from the Central Banks.

QUESTION 7.—FRAGMENTATION OF HOLDINGS.—(*a*) and (*b*) It is difficult to effect improvement as the Mahommedan law cannot be amended.

(*c*) The present law is insufficient. Two members from the zamindar class should be attached to courts to give opinion for the convenience of the court and the public.

QUESTION 8.—IRRIGATION.—There is greater deficiency of water in this district as compared with others. Therefore the period of *abkalani* season should be increased and canals should be improved.

(*b*) I am satisfied with the present system of rotation of water supply. For further improvements and for preventing complaints I suggest the following:—

1. Improvement of silt clearance.
2. Excavation of branch *karias*.
3. Giving equal share of water to those who draw excessively.
4. Restriction on paddy cultivation.
5. Fixing *mopas* for paddy cultivation.

QUESTION 9.—SOILS.—Arrangement should be made for greater supply of water for improving the land.

QUESTION 10.—FERTILISERS.—I am of opinion that natural manure is more profitable than artificial as there is more natural manure in this district.

Cowdung should not be burnt as fuel. Burning manure should be penalised.

QUESTION 11.—CROPS.—(*a*) (*i*) The present ordinary crops are the most useful.

(*iv*) For protection of crops more gun licenses should be given to zamindars in proportion to the size of their holdings.

(*b*) The cultivation of *juar* should be increased because it is very useful for cattle.

QUESTION 12.—CULTIVATION.—Improvement of land and income is brought about by the cultivation of a number of kinds of crops.

QUESTION 13.—CROP PROTECTION, INTERNAL AND EXTERNAL.—There is no measure likely to be useful except the natural one for protection of crops against external infection, pests and diseases.

QUESTION 15.—VETERINARY.—(*a*) It should be under the Director of Agriculture.

QUESTION 16.—ANIMAL HUSBANDRY.—There are two methods for breeding animals:—

(1) Zamindars should be induced to cultivate grass in their lands and the Government should not impose revenue tax on such lands.

(2) In every taluka one or two forests may be reserved where bullocks may be allowed to graze.

QUESTION 17.—AGRICULTURAL INDUSTRIES.—(*a*) The *haris* have much work all the year round. They are only free for some period between the two crops and this they should utilise in improving the lands.

(*c*) These are for those people who have no work. If the Government encourage them it becomes harmful to cultivation. *Haris* are few and insufficient.

Khan Bahadur Dilmuradkhan Bahadurkhan Khoso.

(*d*) to (*h*) There is no need of subsidiary employment. People would derive profit but agriculture will suffer.

QUESTION 18.—AGRICULTURAL LABOUR.—The *haris* of Sind are more useful than those from outside. It would be better if they were freed from other labours and forced to do only agricultural work, in which they should be encouraged. A law should be made for this purpose which would be more profitable than the bringing of *haris* from foreign countries. There should also be a law that if any *hari* leaves his zamindar he should pay all his advances before leaving his village. This will be beneficial. If this is not done there will be much loss.

(*b*) If the above-mentioned suggestions are accepted and the water is increased, there will remain no land uncultivated.

QUESTION 19.—FORESTS.—(*a*) In the present state of things the forests do not get sufficient water, with the result that the meadows are not sufficient. If water is supplied and the tax for feeding cattle therein decreased, it will be very profitable for cattle and there will be no loss to forests.

(*b*) Owing to destruction of forests the people have suffered much loss of fuel and grass, the supply of fuel and grass being very small.

(*e*) There are plots of land belonging to Government near some villages; these can be used for forests.

QUESTION 23.—GENERAL EDUCATION.—The present state of these institutions is good.

Oral Evidence.

(In Sindhi, through an interpreter.)

60180. *The Chairman:* Khan Bahadur Dilmuradkhan Khoso, you are President of the Jacobabad Municipality and a zamindar of Jacobabad?—Yes.

60181. We have your note of evidence. Do you wish to make any statement amplifying that note, or do you wish to answer questions?—You may put any question you want to.

60182. I think your father is alive and is one of the biggest zamindars in Sind; is that so?—Yes.

60183. Have you or your father been able to introduce any improvements in crops or in methods of cultivation on your estates?—Yes.

60184. Would you describe what you regard as your successes?—Clearing land of jungle.

60185. Have you introduced winter ploughing at all?—We use ordinary implements; we level the ground too.

60186. Have you introduced any improvements in varieties of crops, better seed?—We have improved the quality of land by rotation of crops.

60187. What wheats are you sowing now on your and your father's estate?—Pusa No. 12 and "*Desi thori* and *Phandori.*"

60188. Was that introduced through the Agricultural Department's wheat farm at Jacobabad, or how did you come by it?—From Jacobabad farm.

60189. Have you had any other service or help from that farm?—We have been purchasing ploughs from them.

60190. Have these ploughs been a success?—Yes, they have been a success.

60191. Can you tell us what type they are?—The Lyallpur type; we have got big iron ploughs which go deeper into the earth and turn it over. We have similar ploughs made here also.

60192. Do you cultivate any of your land by means of labour to which you pay a wage?—No, it is all done by *haris;* we give them a share of the produce.

60193. You have no home farm?—No.

60194. It is all on the *batai* system?—Yes.

60195. How about the Veterinary Service in your district? Have you received any help from that department?—Yes, we get some assistance from them. People are not used to taking assistance from them.

60196. Have any of your animals been inoculated against rinderpest?—Yes.

60197. Do you believe in that method?—Yes, it is beneficial.

60198. Have you or your father taken any part in improving the breed of cattle in the district?—We have imported Bhagnari and Cutchi cattle to improve our cattle breeds.

60199. Has that been a success?—Yes, it has been a success.

60200. Is there a season of fodder shortage in the normal year?—There is always scarcity of fodder, because there are no forests and there is scarcity of rain.

60201. How about fuel? Do you and your father depend upon scrub jungle for that, or do you grow any timber?—Sometimes we purchase it, sometimes we burn cowdung, and sometimes we burn the ordinary bushes from the jungle.

60202. But you never grow any?—We do not grow trees because trees take away the power of the land.

60203. What do you think of the new Barrage?—It will be a success. Jacobabad district will not derive much benefit from it; it will benefit only a part of it, as most of the canals will not be fed from the Barrage canals.

60204. I hope you are in the fortunate part?—My land will not be benefited.

60205. Does anybody use tractors on their land in your neighbourhood?—We employ our own implements for levelling the ground; we do not use tractors.

60206. No tractors are used for pulling ploughs or cultivating implements or anything of that sort?—No; we have got our own rollers for breaking the earth on land to be cultivated, made similar to the rollers supplied by the Agricultural Department.

60207. Is there any deficiency of labour in your district?—Yes, there is scarcity of labour.

60208. Do you find that your cultivators are liable to leave at short notice?—When there are good rains in Baluchistan territory then most of our *haris* run away.

60209. Do you think the irrigation of this large area is likely to increase that difficulty?—There are many idlers now; if they are encouraged to cultivate the land we shall have no scarcity.

60210. How do you dispose of produce?—We sell it in Jacobabad market.

60211. Do you find yourself tied, at all, to the moneylenders from whom you borrow the funds which you have to give to your cultivators?—We take money from the *sowcars* to give to our cultivators.

60212. Do you find yourself compelled to dispose of your crops through that *sowcar*?—We have to show that regard to them by sending the crop to those persons from whom we borrow but we are not bound to sell our crops to them.

60213. Do you mean you have to do a certain amount of business with them?—As they show favour to me and lend money to me, I have to sell my crops to them; but I cannot be compelled to sell my crops to them. They advance money with that object, that I will sell my crops to them.

60214. Is there a co-operative credit society in your neighbourhood?—There is a society at Kandhkot.

60215. Are you a member?—I am not a member; there used to be a society in my village but that has been abolished for want of proper funds.

60216. What do you think of the movement?—It is a good movement; it saves people from ruin; it ought to be encouraged.

60217. Why did your own local society collapse?—The people who had borrowed money from the society did not return it in time and therefore they closed that society.

60218. *Sir James MacKenna:* Have you much land on the Begari Canal?—Seven or eight thousand acres.

60219. Is that at the top of the canal or at the tail?—In the middle section of the canal.

60220. Have you got adequate water for your land?—There is scarcity of water.

60221. Have you any suggestions as to how the supply could be increased?—There should be silt clearance of canals; and the water should be equally distributed. Government neither does silt clearance nor makes proper arrangements for the distribution of water.

60222. Do you want more outlets or modules or something like that?—Some people take five times as much as their proper share; others do not get as much as one-quarter of their proper share; they should get their proportionate share.

60223. Which they would get if they had modules I suppose?—I have no experience of modules.

60224. Do you cultivate any rice in this land?—A little; I have got forty thousand acres of land, out of which one thousand only is cultivated with rice.

60225. Does rice take a lot of water?—Yes, a hundred acres of rice cultivation consumes as much water as a thousand acres of dry crop.

60226. You only do a thousand acres of rice yourself?—Yes.

60227. How do you cultivate your wheat? Do you sow by drills?—We first water the land; then we plough it three times and then drill the seed. Sometimes we water land in June also so that we may be able to cultivate wheat in *rabi*.

60228. *Professor Gangulee:* Stating the reasons of agricultural indebtedness, you speak of the heavy burden of taxes. Would you explain to us what are the taxes you are referring to?—That the expenses of cultivation are high, assessment is high, and income is small.

60229. What is the land revenue you pay to the Government?—Six rupees per acre in the case of rice cultivation; for dry crops two rupees or three rupees eight annas per acre.

60230. Do you pay any other tax besides that?—We have to clear our *karias* or water courses and that also is a burden on zamindars.

60231. What are the heads of taxes you pay to the Government? First you say land revenue; is there any other tax you pay to the Government?—No.

60232. So that you pay six rupees per acre for rice cultivation?—Yes.

60233. What is your share out of one acre of land, on the average?—Four *maunds*, that is the zamindar's share provided the yield is first class.

60234. Altogether the yield is eight *maunds* and you get four *maunds*?—Yes.

60235. *Mr. Kamat:* You have about forty thousand acres of your own, you said?—The whole family has; forty thousand acres belong to myself, my three brothers and my father. By myself I own fifteen thousand acres.

60236. What is the total assessment paid to Government, roughly, on this forty thousand acres?—About one lakh of rupees annually.

60237. That is about two rupees eight annas per acre on an average?—The dry crop pays two rupees eight annas per annum.

60238. It is a lakh of rupees assessment for forty thousand acres, which works out at a flat rate of two rupees eight annas?—The whole of our land is not cultivated; we cultivate as much as we can get water for.

60239. The whole of this is cultivated through the *haris*?—Yes.

60240. Will you explain the scheme which you suggest on page 166 of your evidence: "Till there is sufficient education and improvement in the people the Government should show consideration to the agriculturists (*i.e.*, zamindars) in giving them small strips of land, by giving them facilities and conferring honours on them." What do you mean by giving small strips of land; is it in addition to all these thousands of acres?—Those who do good cultivation should be given land to encourage them, so that they may be ecouraged to cultivate it better. Land surrounded by their holdings and vacant Government land surrounding their own land should be given to those zamidars who are good cultivators, or adjoining land may be given to them.

60241. That is till they are sufficiently educated? The beginning of the sentence is: "Till there is sufficient education and improvement in the people"?—I suggested that the land should be given to the students of the school; that is, some piece of land should be attached to the school and the produce may be distributed between the students of that school. People are not yet fond of education and unless they are given some encouragement or some prize they will not take to education.

60242. On page 167 I have not been able to follow what you mean by sub-paragraph (*ix*): "The rates of grain vary but zamindars do not know it. There should therefore be fixed rates, for the traders get much profit and the zamindars lose"?—We do not know what are the rates prevailing in England or in Europe; the Deputy Commissioner of the district should send

for those rates and communicate them to the zamindars so that they may produce their own crops and sell accordingly, so that they may not be deceived by the local purchasers.

60243. I have not yet followed this scheme for the protection of zamindars in particular; what is the fixing of rates supposed to be?—The zamindars should know what are the rates obtaining in Europe.

60244. They should be communicated only to the zamindars?—The zamindars should know them so that they may sell their crop keeping those rates in view.

60245. But the Government should communicate this only to the zamindars?—They ought to communicate it to zamindars, and the Government may also communicate it to traders.

60246. *Mr. Jamshed Mehta:* On page 166 you say: "The *taccavi* which is given to *haris* is not under proper control and there is therefore fear of loss." What is the meaning of that?—There was one zamindar who borrowed eighteen thousand rupees and paid it to his *haris;* those *haris* absconded at night time with the money; the zamindar was sued in the civil courts; the creditor obtained a decree against him and his land was sold in execution of that decree.

60247. The statement is that the *taccavi* which is given to *haris* is not under proper control and there is therefore fear of loss. What is the remedy? —Just as there is an Act dealing with workmen's breach of contract, there should be a similar Act to prevent *haris* absconding with the money; there should be some Act to safeguard the interests of the zamindars and that would be to the benefit of all concerned: the zamindars, Government, *haris* and all.

60248. In the next paragraph, you refer to the heavy burden of taxes. What do you mean by that?—The zamindars have not only to pay assessment; they have to spend more on the clearance of *karias* than the assessment they pay. There is scarcity of labour. Formerly, there used to be Pathan labourers available. Government pay very little rebate for clearance of private *karias,* and we have to spend much more on that.

60249. On page 167, you refer to "the present system of rotation of water supply." Do you mean that the system of distribution as carried out at present is defective?—The rotation in the big canals themselves I am quite satisfied with, but I am not satisfied with the rotation in the zamindari *karias.*

60250. Have you got any remedy for that?—The *karias* should be widened and cleared. *Karias* which take more than their proportionate share should not be given that amount of water.

60251. On page 167, with reference to the *haris,* you say "If the Government encourage them it becomes harmful to cultivation". What is the meaning of that?—Those who do not do any work and waste away their time should be compelled by law to work.

60252. You say that if the Government encourage them, it becomes harmful to cultivation. What is the meaning of that? Do you mean that you do not want to introduce any industries such as weaving, rope-making, etcetera, which will keep them engaged during the interval when they have no agricultural labour to do? If the Government encourages such industries for them, is there any objection?—They should not engage in such industries; during the interval they should prepare the land for the next crop.

60253. Your opinion is that they should not engage in such industries?—Yes.

60254. In reply to Question 18 you say "The *haris* of Sind are more useful than those from outside. It would be better if they were freed from other labours and forced to do only agricultural work, in which they should be encouraged. A law should be made for this purpose, which would be more profitable than the bringing of *haris* from foreign countries. There should also be a law that if any *hari* leaves his zamindar he should pay all his advances before leaving his village. This will be more beneficial. If this is

not done there will be much loss. If the above-mentioned suggestions are accepted and the water is increased, there will remain no land uncultivated." Do you mean that there should be nothing binding on the zamindars, and everything binding on the *haris*? Do you desire that the *haris* should be bound down, and laws should be made to tie them down, that they should do no other work but agriculture?—There should be a law for those *haris* who deceive zamindars.

60255. Are not the ordinary laws sufficient?—It is impossible for the zamindar to have recourse to ordinary civil law. If five rupees are taken away by a *hari*, an additional five rupees will have to be spent in the shape of fees to the pleader, etcetera, to recover that amount. As we say in Persian, only a *divana* will go to *divani*, that is, only those who are mad will go to the civil court. It is awkward for a respectable man to go to court.

60256. What is your idea of the new kind of justice which you want? Beyond the ordinary laws, what powers do you want to hold the *haris*?—The Workmen's Breach of Contract Act.

60257. *Sir Thomas Middleton:* Have you tried the Egyptian ploughs that are now being used in Sind?—Dr. Mann came to visit my land, and he admitted that my land was the best in the whole Province. This was confirmed by Mr. Rieu, when he visited my land as Commissioner in Sind. Even Mr. Muir Mackenzie, when he was Commissioner, confirmed this, that I was the best cultivator. I cultivate all my land, and it is for Government to supply the water, because land is the wife and water is the husband and without the husband the wife cannot go on.

60258. Does all this prove that you do not need the Egyptian plough?—Women and land need a husband; man is husband to a woman and water is husband to land.

60259. *Dr. Hyder:* You complain about the scarcity of water in the Jacobabad district. Is there not a Persian saying, which you probably know, in which a query is addressed to the Almighty "If you made Sibi and Sehwan, what was the need of creating hell"?—The winter is also severe. The heat is so severe that it shrivels up the people. Government should supply more water to Jacobabad.

60260. Is there much scope for extension of irrigation in the Upper Sind Frontier district?—Water courses should be improved, new canals should be dug, and the small branch canals should be widened.

60261. What is the tribe of *haris* which you engage?—There are Sindhi *haris*, Bruhi *haris*, and there are also many Baluchi *haris*.

60262. Have the Baluchi *haris* no hereditary right in the land?—They have got no such right; they shift from place to place; they do not cultivate the same land all the time.

60263. You want more gun licenses. What are the drawbacks from which your crops suffer?—First is scarcity of water; then there are adverse winds.

60264. But you want more gun licenses?—We want first better cultivation, and thereafter we want more licenses.

60265. What do you think is a fair tax for the grazing of camels?—If Government are interested in the welfare of the people, they should reduce the grazing fees by half. Where it is one rupee, it should be reduced to eight annas, and where it is eight annas it should be reduced to four annas.

60266. If that were done, the forests would disappear?—Even now the forests are in such a condition that a she-ass will not care to graze there.

60267. *Sir Chunilal Mehta:* You were talking of the clearance of *karias*, and so on. I think you also mentioned better distribution?—Yes.

60268. You said that some people get five times the water, and some people get a quarter of their requirements. What is that due to?—The level of the canal bed has become high; the water courses which are in the upper reaches of the canals, and the low lands there, draw off more water.

Khan Bahadur Dilmuradkhan Bahadurkhan Khoso.

60269. So that, if the canal is widened, the man who gets five times will get ten times the water he gets now?—Their sluices should be reduced. If I get more than my proportionate share, my *karia* should be reduced.

60270. If there is proper distribution, will the amount of water now available be sufficient?—It will be sufficient only when water is available in sufficient quantity and when rice is restricted.

60271. Is there a taluka development association in your taluka?—So far as I know, there is no such association.

60272. Has not Khan Bahadur Azimkhan been in your taluka?—He has been to my district, but he has not yet succeeded in his endeavour to introduce it in the district.

60273. On page 166 you are speaking of the education of boys. You say that a farm should be attached to every school. Is there any rural school in your taluka, near your place?—There is one in Shahdadkot and one in Kandkot.

60274. Have they got a farm attached to the school?—There are pieces of land attached as farms to these schools.

60275. What do you think of these schools?—They are good. Those pieces of land should be increased. The income of that land does not go to the boys; it should be distributed among the boys.

60276. Do you think education on those lines is sound?—Yes. Manual labour is better.

60277. How many acres did your family possess fifteen years ago?—Fifteen years ago, the land was as much as it is to-day; twenty-five years back it was also as much. In the beginning we had large holdings, then it decreased, and then it has again increased.

(The witness withdrew.)

Mr. P. E. AITCHISON, Conservator of Forests, Sind Circle.

Replies to the Questionnaire.

QUESTION 19.—FORESTS.—(*a*) The forest lands in Sind are, I think, being put to their fullest use for agricultural purposes. A feature in the management of the forests in Sind is the system whereby many of the felling areas after the trees have been cut are given over to cultivation for a year or even longer before being sown out with *babul*, the object being to have grass-bound or inferior soils well ploughed and aerated before sowing. These in-forest cultivations are eagerly sought after by local cultivators and help to form a bond of union between the department and the people. They also have a very marked educative effect. The cultivator may be compelled under his agreement to sow *babul* together with his crop or to arrange for irrigation and protection of the trees for a year following his occupation, and he soon learns to appreciate the point of view of the forest official who wishes to foster and protect his young trees in exactly the same way as he does his own field crop. They bewail mutually their misfortune if a herd of goats enters the field during the night and the forest point of view gradually comes to be appreciated.

Grazing may be classed under two headings:—(1) grazing by cattle and (2) grazing by goats and camels. Under Sind conditions, grazing by cattle does comparatively little harm; in many places it does positive good and facilities for grazing by cattle are granted freely.

The case of camels and goats is quite different. The entry into a young *babul* plantation of a few camels or a herd of goats is little less disastrous than the visitation of a plague of locusts. Such being the case, goats and camels can only be admitted to mature forest or to scrub jungle where the growth has little or no value. The number of camels and goats which can be admitted to each forest and the particular areas in that forest to be set aside for them have been carefully worked out but their numbers have necessarily to be restricted. If the forests are to be preserved, I am afraid it will never be possible to allow a larger number of these animals the privilege of browsing.

(*b*) The supply of firewood in rural areas is generally adequate. In regard to fodder, when the Lloyd Barrage canals are in operation the population will increase and the areas of revenue waste and uncultivated scrub lands will be diminished. This may lead to a shortage of browsing grounds available for camels and goats and it is a matter of consideration whether definite areas should not now be earmarked for this purpose.

(*c*) The force of the river Indus is so strong and the soil so friable that nothing in the way of afforestation could succeed in stemming the floods.

(*e*) One of the most pleasing features of Sind is the existence of privately owned woods (*huris*). These *huris* are formed on fallow lands and worked on a rotation of about seven or eight years. The species is *babul* and the woods are thoroughly fenced and rigidly protected. They are undoubtedly a great asset to the landowner who takes the trouble to maintain them; they provide him with fencing material and small rafters, give shade to cattle and can, towards the end of the rotation, be lopped for fodder for goats and camels. As only a small proportion of the wood is required for domestic purposes, the final crop is sold as firewood or can be converted into charcoal, and when the demand for tannin is good the trees can also be barked for this purpose.

The success of these *huris* is due to the ease with which *babul* can be grown in Sind provided there is even a limited supply of water available, its rapid development in an excellent soil and the fact that the woods are thoroughly protected and fenced. In some parts, *e.g.*, between Khanote and Shahdadpur railway station, the whole countryside is dotted with these small woods.

The only area of any extent in Sind where the Forest Department obtains an assured supply of water which can be regulated is the forests of Khathar and Khatro on the Fuleli. This area has been afforested during the past fifteen years and has given the most excellent results both in regard to the development of the trees and the financial returns obtained. All methods of regeneration, trenching, mound sowings, etc., have been tried and the woods have been regularly cleaned and thinned. These methods have been largely copied by the owners *huris* in the neighbourhood and zamindars from long distances have come to inspect this demonstration area with a view to forming similar plantations on their own lands.

The point is whether similar privately owned woods could not be formed elsewhere in India. In many parts they probably could be so formed but the trees would not grow so rapidly, and the wood when mature might not be able to secure a ready market as is the case in Sind, where the system prevails not so much on account of the domestic conveniences it affords as because it is a sound commercial proposition.

The secret of its success in Sind is due to the fact that the owners of these woods protect them against camels and goats just as rigidly as they would protect their agricultural crops.

(f) Until a few years ago, some of the forests in Sind were suffering heavily from excessive grazing or rather from browsing by goats and camels. The damage was caused not only by the animals but by their owners who hacked and lopped the trees to obtain more fodder. These abuses have been abolished and definite and restricted areas set aside for a limited number of browsers. The result has been marked in two ways. Firstly the forests concerned, which were in a state of stagnation, have filled up with a heavy and valuable growth of young trees and saplings; and, secondly, the owners have realised that Government set a store by the welfare of their forests, but are prepared at the same time to allow browsing wherever it is possible and if not abused. The result is that the majority of the owners of browsers no longer lop and hack the trees and do their best to restrict their animals to the areas set apart for them. On account of this attitude it has been possible in several places to increase the extend of browsing areas and to allow a larger number of animals to enter the forests.

Oral Evidence.

60278. *The Chairman:* Mr. Aitchison, you are Conservator of Forests in the Sind Circle?—Yes.

60279. You have given us a note of your evidence. Would you like to make any statement at this stage, or shall we proceed to question and answer?—I do not wish to make any statement.

60280. Have you many complaints from cultivators about the necessary control over grazing which you exercise?—People having camels and goats of course complain. They want to get more grazing, but we have sometimes to be rather hard-hearted about it.

60281. I shall ask you a question or two about the new Barrage area. Have you any projects at all for the planting of trees on land which would be irrigated by the new scheme?—Yes. They have set aside quite a large area; about seventy thousand acres.

60282. In small blocks?—They vary in size. Some of them are quite big. I should think some of them would be ten thousand acres, possibly eight thousand acres, and others smaller. They are really old forests that did not get water before, and they are going to be supplied with water from the Barrage.

60283. They ought to grow timber?—They are good lands, and will grow excellent timber.

60284. How are they to be managed?—They will just form part of the divisions in which they are at present. They will have to be very carefully started, taking the experience in Changamanga in the Punjab to go upon.

60285. Will it be planted with *babul*?—Some *babul* and some *kandi*, and we might grow *tali*, a timber tree.

60286. *Mr. Calvert:* What is *kandi*?—It is like *babul*, a thorny tree.

60287. We have got *dandi* in the Punjab?—It is possibly the same.

60288. *The Chairman:* You point out that one of the peculiarities is that there a number of privately owned woods?—Yes; they are called *huris*, and they are very successful too.

60289. Is the timber grown in these woods usually used by the owners or sold?—Most of it is sold eventually. They sell it either as firewood or make it into charcoal, or they may bark it and sell the bark for tanning.

60290. Is the ground cropped under any regular system of rotation?—It is grown largely on fallow lands. They grow this crop of trees for six or seven years. It grows very fast. Then they remove the trees and put it under cotton, or some other field crop.

60291. What sort of diameter do you get at the end of seven years in the case of *babul*?—About six inches.

60292. A considerable crop of timber would grow?—Yes, it does very well.

60293. Will any provision be made for irrigating these *huris* under the Barrage scheme?—It will simply be fallow land on which they will pay a lower rate of assessment.

60294. The water will be available?—Yes. Of course, they require very little except just to start.

60295. When you say, as you do in one part of your note, in answer to Question 19 (*b*), that the supply of firewood in rural areas is generally adequate, do you think it will be adequate when the full increase in the population, in consequence of the Barrage, comes about?—It will, as far as the main valley of the Indus is concerned. I am not so sure about some of those canals towards the Eastern Nara, where there never was any cultivation before.

60296. You point out the futility of attempting to control the movement of the river Indus by any afforestation. Are there other areas in Sind, where erosion is taking place, which may be checked by means of afforestation?—No.

60297. *Sir Thomas Middleton:* Have you any forest land in Sind on which no grazing is permitted?—There is some small quantity; I think about seventy-two square miles out of a thousand, where no animal is allowed to graze.

60298. What timber is growing in the reserved forest?—Chiefly *babul*, which we try to grow in the best lands, whenever we can.

60299. What is your grazing season? When do you admit cattle?—They begin to come in as soon as the floods have subsided. All the forests are flooded. They come in as the forests are dried up; their greatest activity is in the hot weather, when the *babul* pod crop is available. There is always a great inrush of cattle in April and May.

60300. What are the grazing fees per year?—Buffaloes twelve annas, cows six annas, goats four annas, sheep one anna, and camels three rupees.

60301. You have woods to which you admit buffaloes and cattle, but not sheep and goats and camels?—Yes.

60302. Does the area for sheep and cattle come to about nine hundred and twenty thousand acres?—The area open to cattle is about eight hundred square miles out of one thousand.

60303. How much is open to camels and goats?—It is very little; something like two hundred and fifty square miles, I think.

60304. What is the second choice in these *huris* after the *babul*? Is there any other tree grown except *babul*?—No, there is not. Of course, people have private lands in which they just allow nature to reproduce *kandi* coppice and so on, but *babul* is the only tree for which they sow seed and make a crop.

60305. When this area of seventy thousand acres comes under afforestation, what species other than *babul* will you put in?—We shall put in *kandi*. In Upper Sind, *babul* is very susceptible to frost. We may find that it will not do all over the area in Upper Sind; we shall put in *tali;* and no doubt try other species too.

60306. In the case of these seventy thousand acres, is it the intention to grow mainy in blocks? Are there considerable tracts which lie along the canals?—These old forest lands are more or less haphazard blocks, but they actually lie parallel to the new canals and the railway.

60307. There is no intention of lining the canals with trees?—Not to my knowledge; I do not know whether the irrigation people intend doing that.

60308. *Mr. Calvert:* Do I gather that in fact there is no hope for broad-leaved trees in this tract?—The *tali* of course is broad-leaved. There are even now a few small areas in which we can control the water. Experiments have been made near Sukkur and the number of species that will grow there is extraordinary.

60309. I am speaking of fodder; are there broad-leaved trees for fodder? —Yes.

60310. There is a tree popularly called *bahan;* is it used for matches? —There is a small hand factory in Sind run by a local doctor who really has no time to look after it properly; but there is a possibility; of course the amount of the tree is limited.

60311. Is there any prospect of increasing that tree?—There is a prospect under the Barrage scheme; it is a difficult tree to grow artificially in river-flooded areas because the seed is so light.

60312. *Sir Chunilal Mehta:* Have you any scheme for increasing *babul* plantation to provide more fuel in view of the Barrage conditions?—This scheme which we were talking about, under which we are going to have seventy thousand acres, will add to our fuel area. These seventy thousand acres received no water owing to the Public Works Department protective *bunds*, but these are now going to get water.

60313. Would that be enough to meet the requirements?—There is another scheme for re-modelling the Begari Canal. I have been discussing this scheme with the Chief Engineer. We have a large area of about thirty

thousand acres which gets no water at present. The proposal is that we should give up about half of this for agriculture and in return for that get fifteen thousand acres provided with water. So that will add fifteen thousand acres. That is very good land; it will grow very good timber.

60314. Do you think you require more land to secure that fuel will be supplied so as to prevent cowdung being used as fuel?—It is rather peculiar that in Sind they do not use cowdung as fuel; round the forests they use firewood, they do not use cowdung.

60315. Where there are no forests?—They may then use cowdung; when they get water they have the system of growing *huris*, and these provide them with trees.

60316. Is there anything that we can do to encourage *huris*?—Anything to encourage the *huri* system would be very excellent, because it is an excellent system.

60317. Can Government do anything to encourage that?—The only way I could suggest is to keep the assessment very low for the *huris*. They are fallow land, the assessment in any case is reduced, and it might be reduced still further. Of course they pay their way. It is really a matter of educating the people to have these *huris;* they actually give them a good return in cash.

60318. Have you put up any proposal in regard to it?—I have not.

60319. Do you think it worth while doing it?—There is nothing beyond the fact that you should encourage them to keep *huris*. But there is an area on the left bank of the Indus where I think the question of making one or two forest blocks might still be considered.

60320. Will you put up to Government any schemes which you think worth while considering?—I have been discussing this question with Mr. Harrison and other people lately, and we have not yet come to any definite results.

60321. *Professor Gangulee:* Do you find the area under *huris* increasing?—I think it is increasing.

60322. What is the present area?—I do not know the actual area; I think it is about twenty or thirty square miles; that is, *huris* as distinct from natural forests.

60323. You have suggested special concessions to encourage the *huri* system. What concessions do they enjoy now?—They do not enjoy any but it brings them six to seven rupees per acre per annum. The land is fallow and grows nothing else.

60324. There is no special incentive for extending this system?—No. People with good business instincts go in for it; the rest of the people do not.

60325. The fallow land is utilised in this manner?—Yes.

60326. Are you satisfied with the management of the privately owned forests?—They do very well indeed.

60327. So that people are already educated in that direction?—They come and look at the Government forests and copy some of our tricks, such as trenching, clearing the young woods and pruning the stems and so make them grow faster. They do very well; they know all about it.

60328. Is there an annual *panchari*?—Are you talking about grazing fees?

60329. Yes?—Yes; certain rates are fixed for certain animals.

60330. And you think the present arrangement is quite satisfactory?—Yes; I think so.

60331. *Mr. Jamshed Mehta:* Have you at any time made a profit and loss account of the expenses and income of Government in your department?—Our income last year was about seven-and-a-half lakhs, and our net profit was just under four lakhs; that is to say, we spent about three-and-a-half lakhs to get a gross income of seven-and-a-half lakhs.

60332. Do you cut your forest yourselves or give it to contractors?—Some we cut ourselves; others we give to contractors to cut.

60333. Have you attempted to utilise any labour-saving implements in cutting?—We have tried, but have not been successful.

60334. Do they cost more than manual labour?—We tried one machine, but that was not successful.

60335. The local boards claim that the forests should be given to them for management; are you in favour of that?—I do not think they will be competent to manage the forests.

60336. They are not competent?—I should not think so.

60337. But if they employ efficient forest officers, would you be in favour of it?—No.

60338. Have you attempted to grow other kinds of trees apart from trees for fuel?—Our trouble in Sind up to date has been that all our forests are grown on flood water, the floods of the Indus, so that we cannot control the water, and unless you can control the water you cannot make regular plantations. In the few places where we have been able to control the water the plantations have been successful. Under the Barrage scheme, over the seventy thousand acres the water will be controlled and then we can experiment with all kinds of trees.

60339. Has any experiment been tried with trees which will give timber for furniture making, house-building, etcetera?—The *tali* is such a tree, and it does grow in Sind.

60340. Do you think it will be profitable to grow that tree in Sind?—We have a plantation of that, and it is financially very successful. We get about one hundred rupees for a tree when it matures.

60341. What about blackwood and sandal?—*Tali* is a kind of blackwood; sandal would not thrive.

60342. *Mr. Calvert:* Do you grow mulberry?—It grows in the Punjab, and you can probably grow it in Upper Sind.

60343. *Lac* trees?—Our *lac* trees are *babul* and *ber*.

(The witness withdrew.)

The Commission then adjourned till 10 a.m. on Wednesday, the 26th October, 1927.

Wednesday, October 26th, 1927.

KARACHI.

PRESENT:

The MARQUESS OF LINLITHGOW, D.L. (*Chairman.*)

Sir THOMAS MIDDLETON, K.B.E., C.B.
Sir JAMES MACKENNA, KT., C.I.E., I.C.S.
Mr. H. CALVERT, C.I.E., I.C.S.
Raja Sri KRISHNA CHANDRA GAJAPATI NARAYANA DEO of Parlakimedi.
Professor N. GANGULEE.
Dr. L. K. HYDER.
Mr. B. S. KAMAT.

The Hon'ble Sir CHUNILAL V. MEHTA, KT. } (*Co-opted Members.*)
Mr. JAMSHED N. R. MEHTA.

Mr. J. A. MADAN, I.C.S. } (*Joint Secretaries.*)
Mr. F. W. H. SMITH.

The Karachi Indian Merchants' Association, Bunder Road, Karachi.

Replies to the Questionnaire.

The following answers to such of the questions as can be somewhat definitely answered out of the long Questionnaire are submitted. Answers have been given throughout in a general way. On several technical and agricultural and allied questions, this association is unable to give precise information or suggestions.

This association, is, however, very vitally interested in, and affected by agriculture. Agricultural prosperity in the vast hinterland is the mainstay of Karachi's import and export trade.

QUESTION 1.—RESEARCH.—There ought to be a permanent research station in Sind with a permanent endowment for the whole or part of its expenditure. Such an endowment is as necessary as the Famine Insurance Fund. The present research station at Sakrand is bound to prove very useful. A veterinary research and dairy farm may also be attached to the research station.

The headquarters of research and propaganda ought to be at the same place. In view of the development under the Barrage, Sind should have a separate Director of Agriculture who should direct research, agricultural education, propaganda and demonstrations which may also be on the zamindars' and *haris'* own farms.

QUESTIONS 2 AND 23.—AGRICULTURAL AND GENERAL EDUCATION.—Some of the primary schools now being started in rural areas may be entirely agricultural schools with afternoon attendance school hours and with farms attached where work in the morning may also be done.

Agricultural bias ought to be given to the entire education in the country from the primary to the collegiate. Sind is almost an entirely agricultural Province; therefore, for Sind's economic improvement agriculture should be an important subject in our education. Primary agricultural schools would

prevent the exodus of population from the village to the town, which is becoming a feature of Sind's rural life.

An agricultural college at the research station, at least two agricultural high schools, one in Lower Sind and one in Upper Sind, with a four years' course, and at least one primary school at the headquarters of every division of a district or in the centre of a large group of villages, are a great necessity for Sind. All education may be directed from the central organisation, the Director of Agriculture having an advisory board representing the zamindars and agriculturists and other interests from all the districts. Agriculture could be very much popularised among citizens and students in a number of ways. An Agriculture Day should be observed all over India when charts and mottoes might be displayed in every school and lectures delivered on various aspects of agricultural improvement in every town and village. The new agency of wireless should be fully utilised; the broadcasting stations should transmit popular lectures in the simplest language and every official from the Viceroy down to the *Tapedar*, and every non-official public man and member of a local body may witness field demonstrations near his town or village on the All-India Agriculture Day. Charts and advertisements should be hung up at every railway station, Government and local body offices, market, reading room, library, etc., showing the value of improved agriculture and improved milk-supply.

A ceremony of touching and working the plough on the All-India Agriculture Day to vindicate the dignity of manual labour to the youth of the country would be very valuable. With public enthusiasm in urban and rural areas, the peasants would welcome demonstrations on their own farms, and adopt improved methods and implements more readily.

An important factor in connection with all education is the method of imparting it. The present method is too dull to attract students and the hours of attendance would hit the poor parent badly by taking away the young boy in the early hours of the day when he is most useful in working for the family. Village schools can best thrive in the non-crop season with about three hours of attendance in the afternoon, the method of instruction being made more interesting and less taxing to the brain of the young lad in the country side. The poor agriculturist often cannot afford to part with a young son aged seven or eight years because he helps to increase the slender family income.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—Cultivators are quite prepared to adopt improved methods if they find them proved effective. The peasants do not, and indeed cannot, undertake risks of experiments with any probability of failure, their income being so precarious and small. But they are not conservative. They need encouragement from the Agricultural Department, the zamindar or co-operative society. Leaflets in the vernacular written in a popular manner, demonstrations on model farms and on the agriculturists' own farms, taluka agricultural societies, regular lectures on occasions of fairs and other gatherings, in addition to school education, would be effective. On Agriculture Day, the best cultivators and dairymen should receive some encouragement from Government and local bodies in the shape of remission of taxes for the year. The propaganda section of the Agricultural Department should have an itinerary section equipped with cinema and magic lanterns. Success in this respect would depend to a large extent on the selection of the men in charge of demonstration and propaganda and the extent to which non-official help is secured. Great efforts should be made to secure the agriculturist's confidence by meeting his needs in a sympathetic manner.

To find money for all these—research, education, propaganda, etc.—the Central and Provincial Governments ought to contribute liberally to their agricultural departments. About one per cent of the revenue of the Central Government and every provincial Government and one-half per cent of the revenue of every local body may be reserved for agriculture. These efforts may be administered by the Central Government, the provincial Governments and the divisional boards and strengthened by private contributions from rich landlords and merchant princes. Appeals and collections for funds may

also be made on the All-India Agriculture Day. At preesnt the agriculturist does not get a fair share of what he contributes in taxes to the State.

QUESTION 4.—ADMINISTRATION.—(*c*) There ought to be a definite and settled policy among all State concerns and public utility companies that improvement of agriculture and welfare of the rural population is a vital concern of the State and every public organisation. For instance, the Veterinary Department ought to send men to the peasants' farms to give medical aid to cattle and not compel the peasant to leave his home, farm and crop in the busy season to attend to one of his animals by taking it, often for several miles of rough road, to secure medical aid. The stoppage of the pice post card has hit the agriculturist badly. Wireless has great functions to fulfil in the life of our rural population. If every district local board with Government aid, zamindar's contribution and private munificence set up a loud speaker, to start with at the headquarters of every taluka, they could create a great agency for popular education. The railways ought to have specially low rates of freight for seed, manure, agricultural implements, etc.

At present the rural roads are the most miserable in Sind. The agriculturist pays heavily for lack of cheaper, quicker and more convenient transport. We want a number of feeder railways and a good many *pucca* roads.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—The agriculturist borrows largely because of (*a*) the income from his land being insufficient and unsteady owing to scarcity of water, or poor yield owing to certain pests or poverty of the soil or other reasons, (*b*) lack of proper credit facilities and the consequent payment of heavy interest, and (*c*) lack of education and thrift among the agriculturists generally.

The remedy, therefore, largely consists in (*a*) making agriculture more steadily remunerative, (*b*) securing employment to the peasant in the non-crop season by subsidiary industries connected with agriculture, the supply of necessities to the nearest towns, dairying, rearing of cattle, weaving, etc., (*c*) reducing the drain on his slender income of the heavy interest he pays and the undue profits made by others on his sales and purchases, and (*d*) by general diffusion of education through the school and through personal talks by the itinerary propaganda section of the Agricultural Department with cinema and magic lantern shows.

Credit facilities for the agriculturist must be improved and extended through the co-operative societies.

Legislative action will not help much in this direction.

QUESTION 7.—FRAGMENTATION OF HOLDINGS.—The prevention of sub-division of agricultural holdings into uneconomic units is absolutely essential. This may be done by legislation but as far as possible should be done by co-operative effort.

The law should interfere as little as possible in settlement of disputes. For this the divisional boards, suggested above, may have an Arbitration Section. For success in this direction three things are essential (*a*) a general advance of education, (*b*) growth of the spirit of co-operation, and (*c*) confidence in the persons arbitrating. The last will largely depend on the type of persons who come in.

The area of agricultural land held by an individual may also be fixed to help better development of land. The evil of fragmentary holdings is sometimes as great as that of too big holdings. The latter might also prevent some unemployment.

QUESTION 8.—IRRIGATION.—(*a*) (*iii*) WELLS.—Tube wells worked by power could be established in the different parts of Sind with very great advantage. They may help to establish steady agriculture in areas which Barrage water cannot reach, as well as to supply healthy drinking water for men and cattle in the countryside. At present there is not sufficient knowledge about tube wells or efficient and cheap working of mechanical power on wells, canals or lakes in Sind. As the average agriculturist in Sind is poor, co-operative working of tube wells will be a necessity. The Agricultural Department should thoroughly study the question and give practical demonstrations and help in this direction. If the tube well as a source of cheap water supply succeeds,

steady agriculture and employment may greatly increase in Sind. The working of the Persian wheel by bullock power is costly for many kinds of cultivation—both *kharif* and *rabi*. If in places, where usually there is brackish water in the ordinary wells and boring a tube well very deep makes sweet water available, it would be a very great advantage to have deep tube wells, provided the cost of pumping is within limits and makes cultivation remunerative.

QUESTION 10.—FERTILISERS.—(*f*) The Agricultural Department should find out some cultivation which may be useful as a crop, as a hedge to the field and as fuel. Perhaps some quick growing trees can be found which will answer all or some of these requirements. Also, the regular growth of trees on banks of canals and *karias* would help to provide wood for huts and fuel. Regular keeping of *kuris* (small forests) may also be encouraged among zamindars to provide a fodder and fuel reserve in the dry months.

QUESTION 13.—CROP PROTECTION, INTERNAL AND EXTERNAL.—Sind suffers heavily almost every year from some form of crop pest. The latest to appear is the locust. With regard to none of these pests is the agriculturist at present armed with sufficient knowledge or the requisite machinery to cope with the onslaught. This requires the most earnest attention of the Agricultural Department. Next to the lack of sufficient and timely water supply, these pests make agriculture precarious in Sind. The locusts alone have practically made destitute thousands of our agriculturists during the last fifteen months. First, the proper remedy must be found out by research and study; then propaganda and demonstration must be carried on. If the remedy is costly, the Agricultural Department must bear it. Expenditure by Government may save that part of the land revenue which is remitted every year.

QUESTION 17.—AGRICULTURAL INDUSTRIES.—(*f*) Yes, this is very important. There ought to be a standing board with a paid officer to deal with industrial subjects, collect data, disseminate information and study the needs of each rural and urban industry. Such a board or committee ought to be a permanent body visiting particular areas for investigation, if necessary. There are a number of small industries, such as, the making of leather articles, wooden toys, and articles of daily use in the towns near by, the making of improved implements for agricultural work, for example, Persian wheels, ploughs, etc., utilisation of by-products of several kinds of trees and shrubs growing abundantly in Sind, weaving, etc. Dairying can become a paying part-time or even whole-time industry in Sind in view of the reputed high quality of the Sindhi cow and the possibilty of good fodder supply after the Barrage is completed. The increase of raw produce on Barrage lands may call for some industries for manufacturing those raw products to a certain extent; for instance, oil-seeds may be crushed near big towns rather than be exported. All these subjects necessarily need study and careful investigation.

(*h*) The desire to improve health conditions will come with the advance of education and improvement in economic conditions. Propaganda on modern lines as suggested for agricultural improvement should prove effective. The peasant cannot think of health or cleanliness when the problem of existence perpetually stares him in the face.

QUESTION 20.—MARKETING.—The grower often does not get a fair price. His produce is often practically mortgaged with the zamindar or the village shopkeeper who dictates the price of the produce both for sale and purchase. This is now decreasing because of competition between the shopkeepers who often make advances on precarious credit to help to carry on agricultural operations. The best solution is to help the agriculturist to earn enough for his livelihood so as not to stand in need of borrowing, to raise the standard of his education and intelligence and to help the growth of co-operative societies.

(*d*) Increasing competition between merchants, middlemen and buyers is by itself now having the effect of conveying information to the agriculturist, who is getting more and more into touch with the rates of raw produce in the nearest town.

The Karachi Indian Merchants' Association.

QUESTION 25.—WELFARE OF THE RURAL POPULATION.—There ought to be regular malarial and health surveys of talukas. Through schôol books, the written and the spoken word, the value of health and vitality as an asset for the economic and agricultural efficiency of the worker should be emphasised. India's workman is ignorant, underfed and largely without a friend by his side. There may be a society to serve the agriculturist. Such a society must be largely non-official, but may work in close co-operation with the taluka development society and the co-operative society. Economic and social surveys are essential as without an exact knowledge of facts no proper remedy can be found. But such surveys should be carried out by non-official agency with the help of revenue officials, the taluka development societies, the Agricultural and Public Works departmental authorities and local board staff as the need may be. A non-official survey by trained economists who secure the confidence of the agriculturist will produce more thorough data and be more trusted by the general public. Such a survey would show exactly the conditions of life under which the people in rural areas live. The knowledge itself may inspire some to serve the India that lives in the village.

Oral Evidence.

60344. *The Chairman:* Mr. Jeswani, you are here on behalf of the Indian Merchants' Association, Karachi?—Yes.

60345. Would you describe to the Commission exactly what are the objects of your association?—They are generally to advance the interests of trade, to help united action and co-operation among the Indian mercantile community and generally to bring about co-operative effort in trade among Indian business men.

60346. Have you a large membership?—We have about 180 members.

60347. I notice that your association favours the creation of a permanent research station in Sind?—Yes.

60348. Has your association considered, at all, how such a station might be endowed with the necessary funds?—The suggestion is that the Central Government might contribute about one per cent of their revenue, that the provincial Government might contribute about one per cent of their revenue, and the municipalities and the district boards might contribute about one-half per cent of their revenues: this fund might be administered by the Central Government, the provincial Government and the divisional boards. These funds are to be divided between research, propaganda, education, demonstration and other work in connection with agricultural improvement.

60349. So that you might term the fund a development fund?—Yes, you might call them agricultural development funds.

60350. Where would you like the station to be?—At present Sakrand seems quite suitable, but if for the purposes of research any other station is more suitable, I would not object to the station being moved to that place; but according to Dr. Mann and the research workers at Sakrand, it seems that Sakrand, representing a large area of the new lands coming under the Barrage, is more suitable.

60351. Are you thinking of research in connection with agriculture on the area to be newly irrigated, or are you thinking of research in general?—Research in general, both in regard to new areas as well as the present cultivation.

60352. I have read with interest your association's views about education. To what extent do you desire primary education to be agricultural in its nature? Have you thought that out?—Yes, it is often noticed that ordinary elementary primary education drives the village boy, the agriculturist's son, from the village to the town. We wish to see that tendency checked, and that might be checked as is done in Italy or Denmark by providing an entirely agricultural education. We might proceed to an entirely agricultural education through an agricultural bias school, but it would be desirable, even at present, to have some schools entirely agricultural schools.

60353. Take a primary agricultural school; the boys are going to that school at the age of about five in Sind?—In the villages they would go at about six.

60354. Now a boy goes to the primary agricultural school, as you describe it, at six; what are you going to teach him?—Some elementary nature study, some elementary lessons in hoeing or watering, etcetera.

60355. He is six years old, remember?—Yes; even at present these children do that work on their parents' farms.

60356. Is not the primary purpose of education to impart literacy, the capacity to read and write?—Yes, but, I take it, even in the agricultural school reading and writing and arithmetic will be taught.

60357. What proportion of boys who go to the primary school, as things are to-day, emerge literate? Do you know at all?—Most of them again relapse into illiteracy in the villages.

60358. And yet you are suggesting that a system which you call elementary agriculture, including lessons in sowing and watering and so on, should be superimposed on the present system?—Yes.

60359. Surely that would have the effect of reducing still further the proportion of successes in imparting literacy, would it not?—No, it would have the contrary result, because if education is imparted in the vocation of the child

then he pursues that sort of education even as an adult, because that is closely related to his life's profession.

60360. By all means use the things with which he is familiar in his village home in teaching him literacy, but that is something quite different from teaching him agriculture, is it not? You distinguish between the two things, do you not?—I think if you give him vocational education then he is very much more interested in keeping his literacy up, and the propaganda of the department by means of the cinema or by leaflets will teach the child to maintain his adult education.

60361. What is your own profession?—I am now Secretary of the Indian Merchants' Association; I was a journalist for ten years, and I am a zamindar's son.

60362. If you had a son aged six years, would you teach him the profession of Secretary to the Merchants' Association at the age of six, or would you give him a general education founded on literacy first?—The point is, we have to train the sons of agriculturists so as to keep them on the land. As a zamindar myself I would send my son to the agricultural bias school.

60363. It is easier to keep sons of secretaries in the office than sons of agriculturists on the land?—At present there is a tendency to gravitate to the towns, and we ought to try to keep rural men in the rural areas for agricultural development.

60364. In answer to Question 8, you say: "Tube wells worked by power could be established in the different parts of Sind with very great advantage. They may help to establish steady agriculture in areas where Barrage water cannot reach" and so on. Has your association any experience of the economics of irrigation by tube well?—No.

60365. Will you please turn to your answer to Question 20, on marketing. Your association is of course very familiar with the business which is carried on in the export and import of produce through Karachi?—Yes.

60366. To what extent has your association interested itself in the details of marketing in the *mofussil*?—As an association they have not interested themselves, but several of our merchants are interested in such marketing.

60367. You mean they are buyers in the country?—Yes.

60368. Do you yourself understand the system of marketing in villages?—A little of what I have experience in.

60369. Do you think that is a direction in which, as these matters develop, merchants might take a more active interest? For instance, let me put this to you: have you ever considered the extreme importance of assuring to the cultivator a fair share of the extra value consequent upon improvement in quality of his crop, in order to encourage him to improve the quality?—At present the peasant has had no such encouragement generally.

60370. And you think it is important that he should have, if possible?—It is very important.

60371. If a cultivator is not going to get a share of the premium, the result of quality, he is not going to worry about quality?—That is so.

60372. Is that a direction in which, as things develop, your association might be persuaded to take an interest?—I think so.

60373. *Professor Gangulee:* On the question of a permanent research station, you do not tell us what is your view with regard to the administration of such a station?—I have said that it should be in charge of the Director of Agriculture; it should be directed by him.

60374. With the help of an advisory body?—An advisory body generally I want for other purposes, but the research station would be entirely under his charge.

60375. I see you propose to have an agricultural college at the research station?—Yes.

60376. Is there a demand for an agricultural college in Sind?—I think it would soon arise in connection with the Barrage.

60377. Do you know the student community here at all?—Yes.

60378. Are they likely to be interested in agricultural education?—There seems now to be a very great awakening of interest among the student community with regard to agriculture.

60379. Are you familiar with the Mirpurkhas school?—I have heard of it; I have not seen it myself.

60380. Do you know why it failed?—So far as I know, it was carried on under artificial conditions. It had no natural appeal to the son of the agriculturist or of the zamindar. Some scholarships were given and there were some other inducements. The son of the zamindar thought he was being sought by the Government and was doing something for the Government by going to the school; he did not understand that it was for his own economic benefit that he was being provided with a school; and at that time the agriculturist also did not understand that he was going to benefit very much by the school, as he does to-day partly.

60381. You think times have changed?—I think so.

60382. With regard to the marketing question, are you familiar with the Marketing Bill now before the Council?—The Cotton Markets Bill, yes.

60383. Will that in any way help to improve the marketing conditions of Karachi?—My association think it will not.

60384. Could you explain to us why you think so?—The association thought that the grower of cotton, particularly, is very much scattered in Sind; there is not much contiguous area. The peasant at present sells the produce to the village shopkeeper, and in any case if produce is brought to the market it will be bought by the shopkeeper, so that it will not change the conditions for the grower or the peasant in so far as the selling of cotton is concerned: he will sell to the *bania* and the *bania* will bring it to the market. The *bania* realises quite a good price in the town even to-day.

60385. You suggest that non-official agencies with the help of revenue officials, taluka development associations and others, must carry on the work. Do you know of any non-official agency now existing in Sind which might join hands with the Government organisations?—I am afraid at present there is no such agency.

60386. Do you see any indication of such non-official agencies coming forward?—Yes, there is some awakening among the people at present for the revival of agriculture and for helping the agricultural movement, among the agricultural section particularly.

60387. *Mr. Kamat:* How is the membership of your association composed?—They are dealers in all sorts of things, mostly in grain and cotton.

60388. What is the number of members?—About 180.

60389. Are they chiefly importers or exporters?—Largely exporters.

60390. What is the principal article of export?—Grain, oil seeds, cotton.

60391. Do your members in Karachi come into touch with the producer?—Several of them do through their agents in the villages or in the towns.

60392. Yes, of course, that is through the agents; but do they ever directly come in touch with the grower? Do they go out of Karachi to seek him?—Most of them do not.

60393. Their knowledge of the produce, the quality and all these things, is based on the knowledge conveyed by the middleman?—Not necessarily, because some of them are drawn from those very villages; they have got their agencies and some of them when they go to their villages come in contact with the producers; some of them own their own lands.

60394. On the question of adulteration of raw materials sent to foreign countries, have you any views?—If some method could be devised for securing purity of produce from the countryside, I think the members of my association would be glad.

60395. Where does the adulteration come in exactly?—It usually comes in in the countryside itself where the produce is grown.

60396. Adulteration takes place, not at the port where the produce is exported, but you think in the countryside?—Yes.

60397. Who is responsible for it in the first place?—I know of very few instances myself, but I suppose if there is adulteration it would start with the shopkeeper in the village.

60398. When you say, " if there is ", do you mean to say there is some doubt about it in your mind?—There is some sort of adulteration which takes place without anybody wishing it or without anybody deliberately doing it; for instance, there is a mixture in the seed of wheat and barley, and there is sometimes a mixture in the seed of *juari* and *bajri;* so the mixed seed comes to the town and also to Karachi, and there is an analysis department where we find that out. But I know very few cases of deliberate mixture in Sind; if there is such a case it might start with the shopkeepers. For instance, in some cases, I learnt that some water was being put on seed cotton; that was done at a shopkeeper's.

60399. To whose interest is it to make this deliberate adulteration: the large exporters here?—No, the large exporter practically cannot do it. He cannot do it sufficiently secretly to escape detection. It cannot be done in Karachi, but it may be done in the town to which the produce first comes, or on the farm itself.

60400. Have your members, as large exporters, ever considered what steps should be taken to prevent this deliberate adulteration, wherever it takes place? —Not so far as I know.

60401. That is to say, the association has never bothered itself with going into this question of stopping this adulteration?—I can say that for the last year they have not done it; they might have done it earlier; I do not know.

60402. Are they conscious of the fact that this adulteration is spoiling the reputation of Indian produce in foreign markets?—I think they themselves are interested in seeing that the produce is pure.

60403. How do you mean? They get reports from their agents in England? —No, because when the produce is adulterated there are a lot of disputes between the buyers and the sellers; they like to have as few disputes as possible, because it hits them in their own business.

60404. If that is so, how is it that they have not taken any serious steps, so far, to prevent this adulteration and save the name and reputation of Indian produce?—At present there is lack of contact with agriculture; the exporter here is not in direct contact very largely with the producer.

60405. That is the question I first asked you. He knows the producer only through the middleman?—Yes.

60406. He never knows conditions in the countryside directly?—Quite.

60407. How could that be remedied? Have you any suggestions to make? —That could be remedied by placing the merchant exporter in Karachi in contact with the Agricultural Department, if the department interests itself in improving the quality of the produce.

60408. If the Agricultural Department does this?—Yes.

60409. Do you hear from foreign countries about certain standards, and are the exporters willing to adopt standardisation, to your knowledge?—As a matter of fact, they have adopted standards. Our association and the Chamber of Commerce have got a joint cotton committee now where types and standards of cotton are determined.

60410. That is with reference to cotton?—Yes, and also so far as wheat is concerned there is a certain specification by which the sale has to be made, and the merchant is very much interested in having a good specification of his own produce because he gets a better price for it.

60411. Do they conform to these specifications very honestly when they export?—The merchant here is largely a commission agent: he sells on account of the exporter from the town or from the countryside. He, of course, should try in his own interest to tell the exporter from the countryside that the produce coming from there should conform to a particular specification in order to secure a better price.

60412. Is there anything which your association can really do, apart from the department, to improve grading and to prevent adulteration?—As I said,

that could be very much more effectively done by the Department of Agriculture co-ordinating their activities with those of the association; they should by propaganda make the producer realise, in view of the reports coming from the foreign countries to which the produce of India is exported, that it is in the interests of the producer himself not to adulterate, and to send better produce.

60413. This is the marketing side of the problem; it is not the production side, and I do not know why the Agricultural Department should have to take the initiative; it is more to your advantage; you want to market your produce to the best advantage and you ought to take the initiative. Why is your association apathetic with regard to this problem?—The merchant here is more or less a commission agent; he is not interested so much in getting a better price for the produce as the producer himself is; the Agricultural Department might look at the problem from the point of view of the country as a whole and present the matter both to the producer and the exporter.

60414. Your merchants are not exporters in the real sense of the term: they do not send consignments on their own account?—They are commission agents.

60415. That is exactly what is brought out by your replies?—Yes.

60416. Most of your 180 members are commission agents?—Yes.

60417. And they do not care at all whether the consignment is sold to the best advantage or otherwise, because they are only commission agents?—They are interested because the exporting houses here would not have the produce below a certain specification; they deduct arbitrarily, according to the terms of the contract, a certain amount for produce which is a certain standard specification.

60418. Of these 180 members, about how many export on their own account and are not commission agents?—I could not give you the figures off hand, but I suppose very few are such merchants.

60419. A very small section is composed of members who have really anything at stake except their commission?—Some of them also own factories, rice factories, ginning factories and so on; so that probably they must be interested beyond their commission also.

60420. You need not say "probably"; you are the secretary, so that you know, I hope, what proportion out of your 180 members export on their own account; is it one-quarter or one-third or one-half?—I think, less than one-fifth.

60421. Was this memorandum approved by your Managing Committee before being submitted to the Commission?—By a sub-committee appointed by the Managing Committee.

60422. They voice a desire to have an agricultural college or an agricultural high school?—Yes.

60423. Were they quite sure that there was a demand behind this desire?—It seems there is likely to arise a great demand for agricultural education in Sind.

60424. Would the sons of zamindars care to attend an agricultural college or a high school in Sind?—I think a good number of the parents sending their children for education would now prefer agricultural education to be given to them, in view of the opportunities they might get in the new lands under the Barrage.

60425 *Mr. Jamshed Mehta:* You must have read the contracts which the exporting firms from Karachi make with the commission agents who, you say, are members of your association?—Yes.

60426. I am not talking of cotton; I am talking about wheat and other seeds?—Yes, I have read some.

60427. In those contract forms, in certain specifications, you know that certain percentages of dirt or other foreign materials are specified?—Yes.

60428. Therefore the exporting firms see that the commission agents deliver to them the goods, the wheat or other seeds, according to those percentages?—

Yes. If there is more or less of foreign material, or dust, or barley, or wheat, they get allowances.

60429. Or they give allowances accordingly?—Yes.

60430. It will be to the interest of the merchants, if they find that it pays them to deliver more barley, to adulterate it with barley, or, if the allowances are such as go in their favour, to mix foreign materials with wheat, in order to get the best possible rate out of the exporters. Supposing an allowance of five annas per ton is made if barley is found above a certain percentage, and if they find that the market rate of barley is such that it will pay them to add more barley, they will do so?—The contract form is such that the merchant loses if the material is below specification.

60431. If the market value of the foreign materials is such that it goes in their favour to adulterate wheat with those materials, then they will take advantage of such opportunities. It may not be the commission agents who do it, but it may be done by the men who send it. Is that to your knowledge?—Not to my knowledge.

60432. You suggested the remedy that the Agricultural Department should insist on purity of seed. Instead of this, supposing the merchants on the other side insisted on a certain grade of purity, do you not think that that would compel the producers and the middlemen to deliver the pure stuff?—That is being done through exporting houses. They give a certain quality a certain price.

60433. I am talking of the pure stuff. Supposing the foreign firms insisted on their branches or agents in Karachi supplying them with pure stuff, and those branches insisted upon the commission agents, the commission agents upon the other middlemen and the middlemen upon the producers doing the same, do you not think that that would be a surer and more certain method of speedy improvement in this matter?—It would be, but it is doubtful if the exporting houses will do it.

60434. You are talking of an agricultural college. Given the choice between an arts college and an agricultural college, which would you prefer?—I would not have an arts college, but I would have an agricultural college.

60435. You would be for agricultural training right up from the beginning, that is, from the primary school stage?—Yes.

60436. I think you have suggested in your note that for some hours children should be given agricultural education in primary schools?—Yes.

60437. Apart from your being the Secretary of the Karachi Indian Merchants' Association, you are a zamindar?—My father owns land.

60438. You have also an interest in forest contracts?—My father had.

60439. What do you think about the connection between the zamindar and the *hari* in Sind? We are told that the *hari* is a partner with the zamindar, and he gets half or two-thirds of the crop as the case may be. What is your actual experience? Does the *hari* really get his full half share, or is it merely on paper? How much extra does the zamindar take away from the *hari*? Can you make it clear in the light of your experience?—In lift land the *hari* gets two-thirds, in flow land the *hari* gets half. That is his nominal fixed share. But the *hari* loses out of his share what he pays in high interest.

60440. What interest does he pay?—It varies from eighteen to thirty-six per cent.

60441. Does he pay to the zamindar?—He pays to the zamindar or the shopkeeper or whoever advances him money.

60442. Is it to your knowledge that the zamindars also lend money to the *haris* and take eighteen to thirty-six per cent interest?—Yes.

60443. Do most of the zamindars do so?—I should say that at least some of them do so.

60444. *The Chairman:* Do Mahommedan zamindars charge interest?—Some of them charge interest in produce; they do not take cash. I know of two or three zamindars on the Nawabshah side who take interest on the moneys advanced to the peasants, but in produce. Suppose their share of

the produce is one *maund*, they take from the peasants one-and-a-quarter *maunds*. They do not take cash as interest.

60445. *Mr. Jamshed Mehta:* To your knowledge, the *hari* gets much less than the share which it is stated is being given to him?—Yes.

60446. What is your actual experience about the distribution of water? Three different opinions were given before the Commission. One was that it should be handed over to the zamindars; the second was that it should be left entirely to the engineers, and the third was that it should be left to a committee of zamindars, the Agricultural Department, the Revenue Department and the Engineering Department. Which would you prefer?—I would certainly like a joint committee to distribute the water. I would have half the strength of that committee made up of zamindars, because they are the most interested in the distribution of water.

60447. Is it your opinion that the Engineering Department make mistakes in the distribution of water, because they have no agricultural experience?—Sometimes they do.

60448. Your father was a forest contractor, and you have also some experience in that line?—Yes.

60449. Can you tell the Commission, briefly, about your experience of forests in Sind? Would you like to improve them? What faults do you find in the Forest Department?—I think the maximum is not taken out of them for the benefit of the people. There is too much of undue restriction on grazing. The charges are heavy and the restrictions are too many. Much more than these restrictions is the corruption in the lower ranks of the department, which reacts very badly on cattle-rearing near the forest areas, which would otherwise thrive well. The forest areas are not economically exploited, for lack of transport facilities. I feel that if there were some light railways running through these forests, carrying the fuel products to the towns, the price of firewood in the towns, and therefore the cost of living, would go down considerably, and that would also help the development of the countryside.

60450. You do not think that the grazing facilities are enough at present?—They are badly restricted.

60451. What is your idea about the Lloyd Barrage lands? Do you think farming societies for educated young men would succeed?—I think they would succeed very well, if the young man who undertakes to join such a society promises to do manual work himself.

60452. Do you think that the time has now come when the educated young man would necessarily do it?—He must do it, I think.

60453. What suggestions would you make for the improvement of the villager or peasant, either by self-help, or by Government aid, or by co-operative societies?—There is very great room for self-help left to the peasant, but unfortunately he has no friend to tide him over small difficulties. For instance, when there is a good crop and he is free from debt, he has nobody to advise him how to invest his little saving in grain or in other produce. Even when he is but a little in debt, there is nobody to advise him how to use his spare time, or how to improve his land which can give him sometimes thirty to forty per cent more in yield, and also to protect him from small vexations and interferences from, say, the police, or the Revenue Department or the *zabardast* zamindar himself. If he had some one to look after his needs, I think his position, even as it is, could be considerably improved.

60454. I think you make a statement that some shortage in labour would occur owing to the Lloyd Barrage?—I rather feel that there will not be so much shortage as is apprehended because of two or three reasons. Firstly, the system of cultivation is to change according to the Baker-Lane scheme. We should then have cultivation in *rabi*. At present, during the non-crop season in Sind, most of the peasantry are idle. The new cultivation under the Barrage is to be about fifty-four per cent on *rabi* and about twenty-seven per cent on *kharif*. So that, all the peasantry kept idle at present in the non-barrage areas will be available under the Barrage in the *rabi* season. Secondly, we must take note of the difference in the method of water supply. We will have largely flow lands instead of lift lands, and on flow lands the labour you

need is about half or one-third of what you need on lift lands. Thirdly, the greatest cause at present leading to agricultural precariousness is the lack of a regular water supply. If the Barrage works to plan, and you get a sufficient and regular quantity of water and the agricultural industry becomes more steady, we are likely to attract a good deal of labour from the hilly tracts, from Rajputana, and from Cutch; it will be automatically coming to Sind. Of course, the Barrage is not going to operate all of a sudden; it will take some years to develop the Sind lands, so I do not think there will be difficulty of labour.

60455. Have you any ideas about the size of the holdings in Sind? Have you any suggestions to make?—I have suggested that at present we are suffering in some places from too big holdings also. We have been trying to fix the lowest economic unit for an agricultural holding. I think the upper limit is also very important, because so many people having 20,000 or 30,000 acres are not exploiting their land to the best economic advantage of the country; and if it is desirable to hit the poor man at the bottom by restricting his right of subdivision, which is very necessary in the interest of agricultural development and of society, it is also very necessary to restrict the right of the man at the top to hold land beyond a certain maximum. I think there is such a law in New Zealand.

60456. *Professor Gangulee:* What is the lowest economic holding you have decided upon?—I would suggest about twenty-five acres.

60457. *Mr. Jamshed Mehta:* Supposing a man has 40,000 acres of land, as one fortunate man has, would you deprive him of it?—At present, those who are holding that land cannot perhaps be interfered with; their lands have got to be left to natural sub-division hereafter. I would have that provision strictly made in the distribution of the Barrage lands.

60458. I want to know something about cotton. As you know, forward sales are made in cotton, by the zamindars to the middlemen, or to the ginning factories, because they want money?—Yes.

60459. In your own opinion, the Cotton Markets Bill will have practically no effect as regards increasing the income of the zamindar himself?—The opinion of the association is that it will not help the grower; my opinion is that it will help the grower.

60460. In what way?—I personally think that better marketing and organised marketing will help the grower, because the grower will after all know what is the best price to get in the market, what is the best weight in an organised market, what quality fetches the best price, and so on. Ultimately, it must affect on the grower. That is my personal opinion.

60461. *Sir Thomas Middleton:* You have just told us that, in the districts which you know personally, the zamindar never advances to the *hari* without receiving either money interest or interest in kind?—I have never said that the zamindar does not advance to the *hari*. The zamindar also advances to the *hari*, as does the shopkeeper and also the moneylender. But in some cases, the zamindar, particularly a Mussalman zamindar, does not take the interest in cash; he takes the interest in kind, because he has some religious objection to taking interest in cash.

60462. That is what I stated. So far as is known to you, the zamindars in your district are willing to advance to the *haris*?—Yes, they do advance.

60463. And they never advance without receiving interest either in money or in kind?—That is so.

60464. The interest in kind will be received if they advance for seed purposes, for example?—For anything.

60465. Supposing a zamindar advances money to help the *hari* to buy bullocks, how does he get the return?—At the crop time.

60466. He takes the value of the advance in crop?—Yes.

60467. So far as you know, is there any district in Sind where the zamindar advances money without any kind of interest, because he receives fifty per cent of the produce?—There is a *taccavi* given to the *hari* by the zamindar, which is usually without interest.

60468. That is for wells or for long-term improvement?—No. At the beginning of the season, there is an annual advance made by the zamindar to the *hari*, and that does not fetch interest. It is about Rs. 100 per holding.

60469. That is the common custom?—So far as I know, that is the common custom.

60470. Rs. 100 for what area of land?—For ten to twelve acres of lift land.

60471. Is it calculated per acre, or is it a personal arrangement between the zamindar and the *hari*?—A *nar* or wheel works about ten acres. The *hari* comes and says " I want to cultivate ten acres on one *nar* ", and he gets, Rs. 100 as *taccavi* without interest.

60472. You have made a suggestion for the creation of a fund. Have you made any estimate of the size of that fund when created?—It would be about four crores or so, all over India, for the central agricultural board, for all the provincial boards and for all the divisional boards. In the Bombay Presidency, I would say eighteen lakhs would be for the provincial board; the divisional boards in India might have about half a crore or so.

60473. You have already made a detailed estimate? You have taken the incomes you mention and calculated the yield?—Roughly, it will be about that.

60474. On the question of vocational training, a boy goes to school at the age of six. How long do you suppose he stays at the primary school?—I would put him for three years in the primary school.

60475. No more?—No more. I would shorten the period. I would not make the examination annual, but half-yearly.

60476. In three years most boys would never get beyond the second standard. They would not pass from the first into the second class at the end of the first year?—I would supplement that by adult education, by oral instruction, by a more interesting method of personal lectures and personal teaching.

60477. I am thinking now of the age at which you propose to give vocational instruction to the boy in the primary school. Presumably, it would be between the ages of seven and nine?—It would be between the ages of seven and ten.

60478. *Mr. Calvert:* Does your association normally use the compulsory arbitration clause in all contracts?—Yes, so far as dealings between the members of the association are concerned.

60479. But there is no compulsory arbitration clause in dealing with the up-country dealers?—No. They mostly send to the merchants here without such compulsion.

60480. Any disputes between you and the up-country dealer will have to go to court?—I have not known any such instances.

60481. Does not the compulsory arbitration clause work smoothly?—As between the members of the association, I think it has worked quite well.

60482. There is no trouble from the courts?—No. In fact, it compels the parties to settle out of court.

60483. Either party can go to court to upset the award?—I do not think the court is then empowered to interfere.

60484. The point I was driving at is: how far do you think compulsory arbitration can be used to diminish litigation in villages?—I think it can be used with very great advantage.

60485. Your experience is that, on the whole, compulsory arbitration works well and fairly?—Yes.

60486. Generally the small holder gets his seed from the village shopkeeper?—From the zamindar.

60487. The small holder?—Yes.

60488. Is it to the interest of your association that the amount of produce to be handled should be as great as possible?—Yes.

60489. And it is to your interest that the seed sown should be as pure as possible?—Yes.

60490. Do you think there is any hope of bringing organised public opinion to bear on the up-country shopkeeper to sell only pure seed?—If the shop-

keeper is made to understand that it is in his interest to do it, and if the members of my association make up their mind to deal only with those who follow these instructions as to seed, then I think some advance can be made.

60491. We have been told, practically throughout India, that if you want to get pure seed to the cultivator, you must have a special official pure-seed depôt, and that the ordinary petty shopkeeper will not supply pure seed. But if the private shopkeepers throughout India could somehow or other be induced to supply only pure seed, your association for instance would have a much larger volume of commerce to deal with?—Yes.

60492. How, in your opinion, can the small shopkeeper be induced to give only pure seed?—I think, at present, the shopkeeper is not educated enough to understand the value of pure seed. I would not trust him with distributing pure seed.

60493. You do not think your association could launch out on a propaganda programme to educate the small shopkeeper?—I could not say that, because this proposition has never been put to them.

60494. It is to their advantage?—I think so.

60495. *Sir Chunilal Mehta:* Have you any agricultural experience?—My father holds land in the Nawabshah district.

60496. Has land been in your family for many years?—For about twenty-three years.

60497. Have you yourself any experience of agriculture?—Yes, I have been on my land several times, and stayed there for some months sometimes.

60498. Have you worked on the land yourself?—Yes, for some time.

60499. Can you tell us whether there is now any desire on the part of your association to send the young men rather for agricultural training than for the arts courses?—They have not concerned themselves much with educational programmes in the country so far.

60500. In view of the Barrage, would they like to take any interest now in agricultural education?—I think they would.

60501. Are they considering any scheme whereby they could turn the minds of educated young men to taking up land under the Barrage and working it themselves?—Several of them seem very much interested in the Barrage, but they have not considered this question separately.

60502. Do they propose to consider it?—There has been no such proposal yet. We might consider it hereafter.

60503. Do you think that you yourself, as secretary of the association and as having had agricultural experience, and with the views that you have placed before us about agricultural education, could put before your association any scheme?—I will try, and I will certainly give them the views which I have embodied in this note.

60504. Would you make it a condition that the young men should get some kind of training before they purchase land, or before they form themselves into a society?—Yes; that is very essential.

60505. Where do you think they can get the training now?—At present there is no adequate arrangement in Sind. There are only some farms, the Mirpurkhas farm, or the Sakrand research station, where grown-up educated men could be directed, but to a beginner it would be of no use.

60506. A certain number of boys have been going to the Poona Agricultural College from Sind?—Yes; very few.

60507. Would they go in for the short courses at Poona?—So far, the distance has had a very discouraging effect on the minds of parents and students. Besides, the Poona course has been regarded as too theoretical; some of the graduates who come out from that college have not proved very successful.

60508. You have not had any experience of the short courses in Poona?—No.

60509. You said, in answer to a question, that the cultivator and the *hari* have got no friend to guide them. What sort of friend have you got in mind?—I mean a worker in a co-operative society, a taluka development association,

or in any other society for rural improvement. There is no such society to befriend the peasant when he is in difficulty. There is nobody just there on the spot in the village, when he wants to improve his land to guide him, when he wants a little loan to show him that he can go to a co-operative society and get cheaper credit there, that he can get superior seed from the Agricultural Department, or that he can market his produce in a better way by carting it to another village, and so on.

60510. Would you favour the formation of such an organisation?—I would strongly favour it.

60511. Do you think you can get non-official men to work on such an organisation?—To start with, we will get very few, but I think such a society would gather strength in course of time.

60512. Do you consider that the members of such a society should live in the villages?—It is very necessary that at least some of them should be there.

60513. Would you be prepared to find men who would like to go and live in the villages?—Yes.

60514. Such a scheme would be possible?—I think it would be possible in the near future.

60515. Are you speaking of officials or non-officials?—Non-officials entirely.

60516. Have you seen the Sakrand farm?—Yes; I visited it two months ago.

60517. What is the nature of the work being done there?—They are experimenting on different methods of watering; they are trying to evolve different kinds of seed; they are trying to deal with the problem of *kallar*, rotation of crops, and several other scientific problems.

60518. Have you any suggestions to make?—I have one to make, and that is the necessity of evolving some hedge plant which can provide against cattle trespass and also provide some useful crop and fuel. In the Nawabshah district (of which I have some experience) the problem of cattle trespass is very acute. Sometimes the agriculturist loses ten to twenty per cent of his crop by the cattle of other people trespassing into his fields and eating away the standing crop. If the Agricultural Department could evolve a kind of quick-growing hedge plant which the cultivator can grow on his land, which would supply him with some crop and give him some fuel, it would be very useful. Then, there is also a very great need of finding out remedies for dealing with several kinds of pests which attack food and non-food crops. At present when a disease attacks the *juar* the agriculturist does not know what to do. The Agricultural Department may have a remedy, but the zamindar does not know it. Fifty to seventy-five per cent of his crop may be lost, but the agriculturist has no remedy. The latest enemy of the countryside is the locust; in fifteen minutes miles and miles of the finest crops may be destroyed, without their being able to do anything against it, and all expenditure therefore goes to waste.

60519. You spoke about this hedge. It is perfectly true that the damage done to the crops is very great. Yet the cattle must have some kind of food. Is there sufficient fodder?—No; and that is why the *haris* leave their cattle at night in their neighbours' fields.

60520. Have you sufficient fodder?—The supply is not very adequate.

60521. Have you any suggestions to make in regard to that?—I have suggested that there should be small forests in every village. I would also suggest that there should be some grazing ground attached to every village, for which water should be supplied free and land should be supplied free.

60522. But the grazing grounds are practically bare in Sind?—But I suggest that the grazing ground should get water throughout the year and should be well kept. Along with that there will be the *huri* which will afford shelter to the cattle at noon and during the hot hours of the day.

60523. Have you any suggestions to encourage the formation of *huris*?—Yes; I would suggest that the zamindar who has got a *huri* might be given some little reduction in land revenue. Supposing a zamindar maintains about sixteen acres of *huri*, then those sixteen acres should be revenue free. That

would affect only big landlords, not small landlords, because they will hardly have more than twenty-five acres.

60524. You speak of wells?—Tube wells.

60525. Only tube wells, not ordinary wells?—I have seen ordinary wells, but I have suggested tube wells because they will enable cultivation to be carried on on a large scale.

60526. *Dr. Hyder:* Speaking about hedges, have you not got cactus growing here?—Is it prickly-pear?

60527. It is *thur*?—I do not know that. We have got prickly-pear at Malir. It is a leguminous plant and does not hurt any crop; it grows quickly and maintains itself without water; but it gives no crop or fuel.

60528. That is suitable to the soil of Sind; why is it not adopted?—I do not know why.

60529. *The Chairman:* Have you any land yourself?—My father has.

60530. Can you yoke a pair of oxen or bullocks?—No.

60531. *The Raja of Parlakimedi:* You say that a certain class of zamindars collect interest by kind. May I know what rate of interest is charged?—It probably comes to eighteen to thirty-six per cent.

(The witness withdrew.)

Mr. S. C. SHAHANI, M.A., Zamindar, Jamrao, Sind, Principal, D. J. Sind College and Secretary, Sind Collegiate Board.

Replies to the Questionnaire.

QUESTION 1.—RESEARCH.—(*a*) My suggestions in this connection are that higher research, both agricultural and veterinary, should remain centralised and should be in the hands of the most competent men. The number of scholarships offered by the Government of India for higher research should be greater. At least two of these scholarships should be intended for each Province in India. Decentralisation or provincialisation of this research will tend to lower the requisite standards of research. For the requisite research in the matter of local agricultural problems in different Provinces, *e.g.*, in the matter of selecting the best variety of Sindhi cotton or rice, or of determining the best form of drainage in Sind needed for preventing water-logging of the culturable lands after the Barrage, the Agricultural Departments of the different Provinces should be better financed; and the Local Governments should offer at least two scholarships for the promotion of local research in their own Provinces.

(*c*) Rural economics is, in my opinion, a particular subject for research, which is not at present being investigated, and to which attention might usefully be turned.

QUESTION 2.—AGRICULTURAL EDUCATION.—(*i*) The supply of agricultural institutions is altogether insufficient. In Sind for instance, which is essentially an agricultural Province, there is no agricultural educational institution, college or school.

(*ii*) There is an urgent need for extension of teaching facilities in Sind.

(*iii*) Teachers in rural areas should preferably be drawn from the agricultural classes, for they will have lived in an agricultural atmosphere and their agricultural training will have been on that account better realised.

(*iv*) The attendance at most of the existing institutions is not so numerous as one would expect in present circumstances. The reasons in my opinion are these:—(*a*) The students have jobs in different services as their goal, and become disappointed if at the end of their careers they do not secure suitable jobs; (*b*) the number of institutions being insufficient, if the only college, (like the Agricultural College in Poona, in the Bombay Presidency) happens to be situated at a distance from some parts of the Presidency, *e.g.*, Sind, the attendance becomes thinner still on that account; (*c*) the training in the existing institutions is not practical in proportion to its scientific nature; (*d*) the people are comparatively poor and the number of scholarships and free studentships is not so great as it should be; and (*e*) agricultural education is not properly graded. If at present there are colleges, there are no schools, secondary or primary, and *vice versâ*.

The measures likely to stimulate the demand for instruction are:—

(*a*) Demonstrations that scientific agriculture is more paying.

(*b*) Revision of the ideal of agricultural education: not merely securing jobs but acquiring agricultural knowledge and power. Reservation of one class of jobs, *viz.*, the *mukhtiarkaratis*, otherwise called tahsildarships, for agriculturally trained people, the present judicial functions of the *Mukhtiarkars* being assigned to separate officers, and the *Mukhtiarkars* being confined to the collection of revenue and the organisation of at least one agricultural farm in each of their talukas. This will be a great stimulus, as will be the creation of educated agricultural communities by grants or leases on easy terms of agricultural lands to members, on condition that they live on their lands and cultivate them.

(*c*) Institutions of the right type brought to the doors of the people.

(*d*) Provision of training of the right type, suitable for varied genius.

(*e*) Scholarships and free studentships.

(*v*) The main incentives which induce lads to study agriculture (I take it incentives operating now are intended) chiefly are jobs and scholarships.

(*vi*) Pupils are not solely drawn from the agricultural classes, who are doing cultivation merely according to the indigenous theory of agriculture.

(*vii*) The modifications from the point of view of agriculture of existing courses of study which appear to me to be called for are the inclusion in the arts and science courses of the study of agriculture as an optional subject in Intermediate Science, B. Sc.; and B.A.; the modifications in existing agricultural courses of study will be those arising from the necessity of greater stress being laid on agricultural practice in agricultural cultivation and crafts.

(*viii*) My views on: (*a*) nature study, are that natural manifestations, earth, sky, light, grasses, grains, fruits, flowers, birds and animals, should be made generally intelligible to all students, and their powers of observation and interpretation exercised and sharpened; on (*b*) school plots, that the plots should be numerous, representative, and worked as far as possible by students only under the guidance of teachers, and on (*c*) school farms, that they should be devoted to experiments with the staple products of the locality, and to small dairies and their products.

(*ix*) The careers of the majority of students who have studied agriculture are:—(*a*) Agricultural Service, (*b*) Forest Service, (*c*) Revenue Service, and (*d*) management or cultivation, or both, of one's own or other lands. In Sind (*d*) is rare. As the agriculture of Sind develops, especially after the Lloyd Barrage is completed, (*d*) can absorb a progressively larger number of our agriculturally trained men. As it is, pathetic sights such as that presented here by a B. Ag., selling shoes and boots as a shop assistant are not uncommon.

(*x*) Agriculture can be made attractive to middle class youths (*a*) by restricting appointments to the Agricultural, Forest and Revenue services mainly to agriculturally trained middle class youths, (*b*) by granting to such youths holdings or leases on easy terms on condition that they live there and do the cultivation themselves, and (*c*) by demonstrating that agriculture can be made as paying as any other industry.

(*xi*) There are, to my knowledge, very few movements for improving the technical knowledge of students who have studied agriculture. Industrial chemistry or other sciences can be included in the agricultural, arts and science curricula. Agriculture can be industrialised by the teaching of, *e.g.*, the processes of making molasses, pressing oil-seeds, ginning and pressing, or milling grains, while cultivation can be industrialised by the teaching of the methods of using tractors or other mechanical devices.

(*xii*) Adult education in rural tracts can be popularised by (*a*) making it free, and (*b*) demonstrating that agriculture can be made a paying proposition. As in America and Germany, the cinema with its graphic representation of the success of certain agricultural methods may, I think, be employed with effect.

(*xiii*) Free education and demonstration in rural areas can be done best for the present by the Agricultural Departments, which should be better financed by their Local Governments, with earmarked revenue from, if need be, certain special educational cesses levied from comparatively large landholders.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(*a*) The measures which, in my view, have been successful in influencing and improving the practice of cultivators are the following:—

(1) The existence in the midst of cultivators of a superior cultivator whose practice of cultivation is really an improvement in one

or more respect upon the general practice. In Sind nothing has done so much good as the devotion of the Punjabi cultivator to the method of breaking several times the land that he puts under cultivation and thus aerating it. The necessity of manures has thus been a great deal reduced, and the economical use of water inculcated.

(2) The selection of seed and then its distribution by the Agricultural Departments on their seed-farms, through ginning factories or by imports.

(3) Demonstration on the cultivators' own lands.

(4) The bulletins issued by the Agricultural Departments, to a certain extent, whenever they are translated into vernaculars, which are known to a few of the cultivators.

(5) The exhibitions and shows that are occasionally organised by the Agricultural Departments.

(*b*) My suggestions for increasing the effectiveness of field demonstrations are as follows:—

(1) Conduct them on the cultivators' own lands.

(2) In this way show the cultivators that in their own conditions scientific methods of agriculture can be more paying.

(3) Cinema shows with their spectacular effect can be a material help in securing the cultivators' faith in scientific methods of agriculture.

(4) The demonstrators to restrain their autocratic or snobbish tendencies of behaviour and make the cultivators feel quite at home in their midst, so that the tradition of knowledge may, through sympathetic contact, prove adequate and effective.

(5) Those of the cultivators who would be ready and willing to adopt improved methods to be discriminated, and then interested and utilised for field-demonstrations and propaganda work, by means of subsidies or otherwise.

(*c*) The methods whereby cultivators may be induced to adopt expert advice should in my opinion be preferably the following:—

(1) Select the most advanced of the cultivators, and get them to adopt expert advice in their practice by affording them facilities to make their practice a real object lesson to the cultivators round about.

(2) Bring within easy reach of them the means of right agricultural training.

(*d*) I am aware of one striking instance of the success of demonstration work, and of one striking instance of the failure of it.

My recent visit to Renala in the Punjab showed me that Sir Ganga Ram, with requisite facilities afforded him by Government, has by generating electricity for lifting water for irrigation, and then by irrigating thousands of acres by flow, organised some most valuable demonstration work.

I have also known signal failure attending the reclamation from alkali attempted on a comparatively large farm on the Dowlatpur Minor from the Jamrao in Sind. The selection of soil for reclamation purposes, the methods employed, and the officers appointed to do the demonstration work, were all wrong.

QUESTION 4.—ADMINISTRATION.—The means I would suggest for the better co-ordination of the activities of the Government in India are periodic inter-provincial conferences and a more careful interchange of bulletins.

The directions in which the Government of India may usefully supplement the activities of the local Governments may be indicated thus:—

The work of the central and provincial research institutes may be confined to the consideration of All-India and local problems, respectively,

so that there may be no unnecessary duplication; and the research institutes may in the conduct of their work carefully note, and then indicate to one another, the local or central nature and character of the various collateral problems that appear to them to be pressing for solution.

(*b*) It is my opinion that by increasing the scientific staff of the Government of India, and Indianising it as far and as early as possible, the varied expert scientific knowledge required in the development of agriculture in the different Provinces could be supplied to a greater extent than is the case at present.

The types of work which would benefit by pooling the services of experts are various, *e.g.*, sericulture, production of lac and other resins, tanning materials, growth of useful trees, etc. The control here should be central. Decentralisation would promote development of different Provinces while not preventing their participation in the life of the Central Government.

(*c*) I am fairly satisfied from the agricultural standpoint with the services afforded in the whole of India by the Agricultural Service, railways and steamers, posts and telegraphs excluding wireless, but not at all by the Veterinary Service, Meteorological Department, roads or wireless telegraphy. The fairly satisfactory services should be made more satisfactory. The Agricultural Service should be better organised in its personnel, demonstrations and propaganda, as has been in substance indicated above. Railways and steamers should so regulate their freights as to help in the cheapening of the cost of agricultural produce, and in the industrialisation of agriculture, as should posts and telegraphs by reducing their charges. The Veterinary Service at any rate in Sind, the Meteorological Department, roads and wireless telegraphy are yet in their incipient stages of existence and need considerable development. Trunk roads in Sind must soon be metalled. The agriculturist must know whether or not he is to expect rain in any season. A metalled road within two miles of every village and a railway within eight miles of it can and should soon be secured for the success of agriculture in every Province.

QUESTION 5.—FINANCE.—My views as to the steps that should be taken for the better financing of agricultural operations and for the provision of short and long term credit to cultivators are as follows:—

(1) So develop the co-operative credit societies that the provision of short-term credit for the cultivators for all their operations may be found sufficient, so that the cultivators may not need to apply to the *sowcar* (moneylender) for any help; and so organise agricultural education that the cultivators may view the co-operative credit societies as living institutions well able to finance all their operations.

(2) Establish land mortgage banks, also called land banks or agricultural banks, at least one in each district, which should give cultivators long-term credit, wherever necessary and deserved, information regarding which should be made available for them by the co-operative credit societies.

The moneylender may thus be made to disappear or he may then find it to his benefit to invest some of his money in the co-operative credit societies and the land mortgage banks.

(3) Government *taccavi*, which should supplement the work done by the co-operative credit societies and the land mortgage banks, should be worked less rigidly, nay, more easily, in the matter of its distribution and collection. Not the revenue officers but the village panchayats, and much easier instalments fixed by the panchayats themselves, may make this source of financial help to cultivators really useful.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—(*i*) In my opinion, borrowings are to be distinguished between those needed for ordinary operations and those needed for improvements. Borrowings for improvements may reasonably have to be made by the cultivator, who as a rule finds it difficult

under existing conditions to command a surplus for the adjustment of his receipts and expenditure. Borrowings for ordinary operations are caused by external and internal causes. The external causes are mainly inadequacy of water in a Province like Sind, wrong methods of cultivation, high assessment and exactions of revenue and P. W. D. subordinates, comparatively high marriage and other social expenses, laws like the Deccan Agriculturists' Relief Act, which lead cultivators to think that they may evade repayment of loans by running away from one holding to another and *patharis*, who, helped by influential zamindars and police owing to shares received from them, lead cultivators to think that their main income may be derived from cattle-lifting and other thefts, and not from cultivation. The internal causes are the cultivators' improvidence due to no education, intellectual, moral or spiritual, *i.e.*, no mosques, no schools, and the cultivators' physical inefficiency, due to no *pucca* houses and no hospitals. Cultivators thus come to be involved in heavy indebtedness, and show no ambition to rise out of their economic bondage.

(*ii*) The sources of credit in my opinion are the zamindar, the *sowcar*, the Government and the co-operative credit societies.

(*iii*) The reasons preventing repayment are inadequate yield and dishonesty. The causes of inadequate yield are unprepared condition of land from want of money and indisposition to work owing to bad agricultural training; the causes of dishonesty are bad moral and spiritual training, and bad laws like the Deccan Agriculturists' Relief Act.

(*b*) The measures in my opinion necessary for lightening the agriculturist's burden of debt are: improvement of water supply, better intellectual, moral and spiritual and agricultural training, better laws calling for exact accounts from the moneylender but not interfering with collection of legitimate debts, and short-term and long-term credit on easy terms.

Special measures to deal with rural insolvency, to enforce the application of the Usurious Loans Act, or to facilitate the redemption of mortgages should be so designed as not to shake the cultivators' credit, or to undo the good relations subsisting between them and others of the society to which they belong, which will, however, be very difficult of achievement. Special protective measures should therefore, on the whole, be avoided.

(*c*) Measures taken to restrict or control the credit of cultivators, such as limiting the right of mortgage and sale, like Act III providing for the occupancy of lands on the Jamrao Canal in Sind on restricted tenure and not on capitalists' terms, operate, in my opinion, against the occupants by reducing their credit, and against the interests of society by letting those hold land who are least fitted to cultivate it. But non-terminable mortgages may be ended in order to give the mortgagor a chance of re-establishing himself. As far as possible, hereditary cultivators should be enabled to remain as cultivators.

QUESTION 7.—FRAGMENTATION OF HOLDINGS.—(*a*) The means for reducing the loss in agricultural efficiency attendant upon the excessive subdivision of holdings in my opinion are: (*i*) co-operative farming, (*ii*) prevention of excessive subdivision by Government fixing the standard unit of holdings, and (*iii*) by the occupants of extremely small holdings finding it necessary to sell their holdings to their neighbours who, by joining the newly acquired holdings to those already held by them, make their holdings larger and therefore capable of being profitably cultivated. (*i*) is the best means; (*ii*) is the next best means; and (*iii*) next to (*ii*). Government agency may, however, be considerably refined by its seeking co-operation with village communities.

(*b*) The obstacles in the way of consolidation by co-operative farming will, in my opinion, be overcome by education of cultivators and by their actually experiencing the benefits of co-operation in farming; the obstacles in the way of consolidation through Government agency may be overcome by Government reducing the cultivators' dislike to interference by seeking co-operation with village communities; and those in the way of consolidation by natural sales, such as prestige attaching to agricultural ownership, may

be overcome by (*a*) development by education of the cultivators' disposition to mind the business side of agriculture, and by (*b*) provision of industrial occupation for holders of extremely small holdings, when they will be ready to forego considerations of prestige for the sake of earning a livelihood.

(*c*) Disputes with reference to fragmentation of holdings should be kept out of the courts as far as possible, and referred to panchayats and communities. At present, litigation has become very costly and judicial decisions have in addition a tendency to be dilatory. But certain laws will become necessary to deal with the interests of minors, widows with life interest, legally incapable persons, etc., as affected by the newer measures necessitated by the inconveniences arising from fragmentation. The execution of such laws should be done as far as possible through panchayats and communities.

QUESTION 8.—IRRIGATION.—(*a*) Sind has already been instanced as a Province in which irrigation schemes should be adopted; and the Lloyd Barrage Project, including canalisation, has been begun.

(*i*) The Jamrao, designed to be perennial, should be properly regulated in its upper reaches too; its head should be improved, and if necessary changed. Non-perennial canals will be improved if another weir is constructed at Kotri, and a third in the lowest reaches of the River Indus.

(*ii*) Tanks and ponds will not ordinarily be of much use in Sind, where the rainfall is small. Tanks and ponds for the storage of water to be used for winter crops can, however, be very useful. During the inundation season water is run to waste in escapes, etc., because there are no tanks in which to store it.

(*iii*) Tube wells should be introduced in areas where the subsoil water is sweet.

(*b*) The existing methods of distributing canal water to cultivators should be made uniform. If moduled outlets have been found satisfactory, they should be made uniform and should be provided all over a distributary or a minor, and in all distributaries and minors, whether inundation or perennial. Internal distribution in holdings of canal water should be left to the holders, the P. W. D. having nothing to do with it except where there are more holders than one on a watercourse, and that too only to the extent of fixing the rotation for the different holders.

No methods have, to my knowledge, been employed to prevent wastage of water by evaporation and by absorption in the soil. A somewhat larger moduled outlet should be deemed due to the holders at the tail. But on the Jamrao, outlets in the upper reaches are made narrower than they should be, with the result that the holders there are starved, and water at the tail becomes superabundant, so that a larger area is irrigated than should be, or water is let into escapes or otherwise wasted.

QUESTION 9.—SOILS.—(*a*) (*i*) Improvement of soils by drainage is essential, and should be carefully considered. The Barrage Scheme in Sind may lead to deterioration of soils from waterlogging, if at the same time careful drainage is not introduced.

(*ii*) Alkali land, as it is known to me, is reclaimed by profuse waterings duly drained away, by certain crops, like rice, and by certain fertilisers.

(*iii*) I do not know how to prevent erosion of the surface soil by flood-water, except by controlling the flood-water.

(*b*) I can give instances of lands which within my recollection have undergone improvement by constant breaking up and aeration, as also of soils that have become alkaline from overwatering.

(*c*) Lands gone out of cultivation may be distributed free of cost, to those willing to take them, so that there may be a chance of their improvement. Certain kinds of alkali, known as *reh* and *kallar*, are very difficult to reclaim, so far as I know.

QUESTION 10.—FERTILISERS.—(*a*) In my opinion, greater use can profitably be made of natural manures, dry and green, than of artificial fertilisers. Mixed manures, however, are desirable. Bones and oil-cakes should be preserved, and an impetus given to the manufacture of phosphates, nitrates, sulphate of ammonia and potash manures.

(*b*) To prevent the fraudulent adulteration of fertilisers, sellers may be made to sell under guaranteed analysis conducted in Government test houses and by chemical analysts.

(*c*) New and improved fertilisers can be popularised by the Agricultural Department by making experiments with them on the lands of cultivators, by cheapening their cost by reducing freights charged by railways and steamers and by special concession rates, and even by making special grants to makers of manures.

(*d*) Bombay Presidency, excluding Sind, is using sulphate of ammonia, while southern India uses phosphates, to a large extent.

(*e*) The effect of manuring with phosphates, nitrates, sulphate of ammonia, and potash manures has not been sufficiently investigated in Sind.

(*f*) If the Forest Rules are relaxed to some extent and fuel cheapened, cowdung may not be used as fuel. A law preventing the practice of using cowdung as fuel is not desirable.

QUESTION 11.—CROPS.—(*a*) My views on the topics enumerated under (*a*) are as follows:—

(*i*) and (*ii*) Existing crops in Sind may be enumerated mainly as—(1) cereals (*bajra, juari,* wheat, rice); (2) legumes (*mung, mah, matar,* gram, *urid, tur*); (3) cotton (*desi,* American); and oil-seeds (*til, sarah, jambho, castor*). These crops would be improved by—(1) selection of seeds of selected varieties; (2) hybridisation; (3) perennial supply of water, water-supply in March or at the end of February being necessary for successful cultivation of America, Egyptian and other varieties of longer-stapled cotton, which take comparatively long to ripen.

The one new fodder crop which I would wish largely introduced is *berseem* or Egyptian clover, which serves as an excellent green manure.

(*iii*) Seeds should be most carefully selected, preferably at seed farms worked by the Agricultural Departments, and then distributed to cultivators.

(*iv*) Pigs should be shot down. A suitable rat-bane still needs careful research.

(*b*) I do not know of any heavy yielding food crops in replacement of the present crops.

(*c*) Fruit culture in Quetta, etc., culture of longer-stapled cotton in Sind at one time, and sericulture in Bangalore may be mentioned as some of the crops more profitable than the existing ones which have come under my observation.

QUESTION 12.—CULTIVATION.—I can suggest improvements (*i*) in the existing systems of tillage by early and repeated ploughings and aeration, and by ploughs improved by adaptation, and (*ii*) in the customary rotations by the introduction of *berseem* when intensive cultivation becomes possible.

QUESTION 14.—IMPLEMENTS.—(*a*) Tractor ploughs, etc., should be introduced.

(*b*) The steps which could usefully be taken to hasten the adoption by the cultivator of improved implements are the provision of an efficient system of roads, cheap transport and co-operation.

(*c*) The chief difficulty in the distribution for sale throughout the country of agricultural implements is freight.

QUESTION 16.—ANIMAL HUSBANDRY.—(*b*) (*i*) Common pastures in villages are disappearing owing to encroachments for cultivation purposes. They should be restored.

(*c*) Fodder shortage in Sind where there is no adequate rainfall is most marked between October and July.

(*d*) Better water supply will improve the supply of fodder in Sind.

QUESTION 17.—AGRICULTURAL INDUSTRIES.—(*a*) The agricultural operations on a holding cultivated with cotton (fixing unit of culturable area at 8 acres per cultivator) will be: clearance of jungle and removal of stumps (1st to 24th May), sowing and ploughing (24th May to 10th June), 8—10

waterings (July to November), pickings (October to January). An ideal cultivator breaks the soil and aerates it from February to May. The operations are done mostly by labourers. Even the best cultivator of cotton is engaged only half his time.

The grower of cereals is free about three months more every year. His operations end in December and begin about a month later.

On a perennial canal a cultivator also grows wheat and devotes to agricultural operations about two months more. His leisure may be reckoned at four months a year.

(*b*) New subsidiary industries to occupy the spare time of an agricultural family, which could be established with Government aid, are: spinning and weaving, poultry rearing, rope-making, basket-making, oil pressing, sugar-making, cotton-ginning, rice-hulling, etc.

(*c*) The obstacles in the way of the expansion of such industries are chiefly those arising from want of agricultural education, of adequate funds, of developed transport, etc.

(*d*) Government should do more to establish industries connected with agriculture.

QUESTION 20.—MARKETING.—(*a*) I do not consider existing market facilities to be satisfactory. I refer especially to market facilities for cotton, which I grow. I sell my cotton chiefly to Messrs. Ralli Brothers, and to Messrs. Volkart Brothers. I find I cannot realise more for the longer-stapled varieties of cotton than for the short-stapled varieties. This year I have realised less. I attribute this to inadequate market facilities. I sent consignments of Egyptian cotton, some time ago, but lost over them, and discontinued them. I would suggest co-operative ginning and marketing as an improvement of marketing facilities. Larger consignments could then be made, which, if good, will come to be sought, making possible the maintenance of agents in centres where our products are fancied.

(*b*) I am not satisfied with the existing system of marketing and distribution. I refer chiefly to cotton, the channels of marketing and distributing of which from the producer to the exporter are myself and my *haris* who produce, certain *banias* who buy and sell to firms like Messrs. Ralli or Volkart, and Messrs. Ralli or Volkart who ultimately buy, gin and export to Europe or to Japan, as merchants and not as commission agents. The services of firms like Messrs. Ralli or Volkart are very efficient; but the margin upon which such intermediaries operate are very large. Each transaction of mine is financed by Ralli or Volkart or the *banias* who buy from me to sell to firms like Ralli or Volkart.

(*c*) The steps I would suggest, whereby the quality, purity, grading or packing of agricultural produce may be improved, are those that will give those engaged in distribution themselves a name, in which case they will see that produce (*e.g.*, cotton, of which I am speaking) of the right sort is pressed and packed. When I was a member of the Indian Central Cotton Committee I had occasion to see the very worst samples of pressed cotton, sent by the British Association for inspection, which might have yielded some profit to the intermediaries but which must have earned a low reputation for the new varieties grown in India.

(*d*) I think effective steps should be taken to place at the disposal of cultivators, merchants and traders information as to market conditions, whether Indian or overseas, crop returns, complaints as to Indian produce from wheresoever originating, and agricultural and marketing news in general. I sold all my cotton this year early because everybody told me cotton prices would go down, whereas I now see that I would have gained at least Rs. 3 per maund of *phuttis*, if I had waited.

60532. *The Chairman:* Mr. Shahani, you are Principal, Dayaram Jethmal Sind College, and Secretary, Sind Collegiate Board?—Yes.

60533. You are, I think, a large zamindar in Sind?—I am a comparatively large zamindar.

60534. Is your time spent mainly on the arts college or do you find enough time to attend to your responsibilities as a zamindar?—I spend my vacations, holidays and week-ends mainly in looking after my estate, so that I may be said to be doing agriculture myself, attending to the two things as best I can.

60535. Could you give the Commission some indication of the extent of your holdings?—It will be three to four thousand acres.

60536. Have you yourself succeeded in introducing any improved crops?—I was the first to try experiments with Egyptian cotton; I have tried experiments with American cotton on a large scale; I have tried also to improve the *desi* strain; I tried about six varieties of wheat, when water was available for such experiments.

60537. Have you been successful?—I succeeded very well with Egyptian and American cotton and wheat. I have succeeded in all things; only I cannot command the requisite water supply.

60538. Will you enjoy perennial irrigation as a result of the new Barrage?—Yes. I am on the Jamrao Canal, which is designed as a perennial canal. It worked very well for some time, and then become a failure, and I find it has not yet been improved. A layman like myself feels that the thing could be put right in about three years' time. I really cannot understand why so much time has been taken to improve it.

60539. Have you interested yourself in the schemes for research which are being developed in order to cope with conditions as they will exist after the new Barrage is in working order?—I think I have.

60540. If there is anything in your mind outside your note, perhaps you will say it now?—I would like to emphasise the importance of research in connection with irrigation first. The condition of the Jamrao is to be studied and also the condition of the other canals. Some of the inundation canals are working better than the Jamrao Canal. If there were a body of researchers bent on finding out why these canals have succeeded, I have no doubt that they would find the remedy to be applied in the case of the other canals. If some canals are working well then the conditions which are responsible for their success ought to be studied and the result of the study utilised in improving the condition of the other canals. Some research should also be done with regard to the utilisation of subsoil water. Water-logging would then be reduced; and water would then be made available at those places where it is now most urgently needed. The construction of tube wells presents great difficulty in Sind, but I understand that the difficulty has been much reduced in other places. We want a body of researchers who will make the requisite research regarding tube wells and then do some propaganda work to let the agriculturists know where and how they can avail themselves of tube wells.

60541. You have a good many factors to consider in tube wells, the initial cost of boring, the cost of raising the water, the potential value of the land, and the facilities for marketing the crop which will be raised as a result of that irrigation?—The market should in Sind be considered a secondary factor, the primary factor being water. Ordinarily, all produce is easily disposed of. With the improvement of the condition of the village life the consideration of all factors necessary for the success of tube wells will become easy. I have got a scheme to put before you which is this: Village life must be carefully organised. I feel very thankful to Sir Chunilal Mehta for introducing the taluka development associations. But to make these associations duly successful, there should be, connected with these, village committees or associations, and then inter-village committees or associations (six villages may be grouped together for this purpose); then the taluka

associations should be combined into divisional associations, and those into district associations, and those again into a provincial association. I want all these to be non-official organisations; and it should be obligatory on the part of the Mukhtiarkar, the Deputy Collector, the Collector and the Commissioner periodically to consult these organisations. When this is done, requisite information for generalisation and practice will become available for researchers, organisers, administrators and financiers, and the agricultural condition of the country will improve. To give but one instance: we have tried lately two varieties of American cotton—4F and 285. Now the Agricultural Department here have been led to believe that 4F is better than 285. I have had a different experience, and I told the Director of Agriculture that 285 was better than 4F, but he got slightly upset. He thought the information given him by his own men was reliable. I was a member of the Indian Central Cotton Committee and brought the matter up before the committee. Some of the members gave it as their opinion in very definite terms that 285 was better. Yet what is being done now? 285 is given up, and 4F is continued. See the inconvenience which thus arises to the cultivator. Now, if there had been information available, the reason and imagination of the researcher would have been properly exercised.

60542. Is there any agricultural teaching in the college with which you are associated?—None. I would have been able to provide agricultural training on the 2nd June 1927; my scheme was complete, but an adverse opinion was given by the Director of Agriculture to the Commissioner in Sind. This opinion was sent on to me and I was asked not to move in the matter any further, although the standing committee has passed my scheme, I have thus not been able to start the college; I am retiring on the 10th November, partly on this account. This scheme is to be referred to you and your opinion must be given before any attempt at starting a college is made. I have brought these copies* of my scheme, and I would request that they be distributed to the members of the Commission for their consideration. This is a scheme for an intermediate college. I feel that we want intermediate colleges and continuation schools more than colleges themselves. I have succeeded in introducing some missionary spirit into the working of my college. I feel that the Principal and Professors of the college between them should be able so to organise an intermediate college as to make it least expensive and at the same time most efficient.

60543. *Dr. Hyder:* You mean an intermediate college as established in the United Provinces, or an intermediate agricultural college?—The latter. I do not know that the United Provinces have special intermediate college. In the main, my idea is that university teaching should be separated from the lower teaching. University teaching properly is more theoretical, and serves as a basis for post-graduate research. Now, I want in the first instance that the pupils should know the elements of agriculture and should be in a position to apply their knowledge to agricultural practice. I have always conceived two factors to be necessary in the organisation of agriculture: expert advice and practical experience. Those that are practically engaged in the work of agriculture also possess imagination.

60544. You have not understood my point. It has been recognised by the University Commission that university teaching should be separated from the lower teaching. Do you want to combine practical instruction with theoretical instruction? Do you want to teach other subjects also?—I have differed from the Bombay University in this matter. The University think that every intermediate college that is brought into being should become first grade. That is a wrong idea. That would mean duplication of laboratories and libraries, and consequent lowering of the standard of university teaching.

60545. My point is: Are you going to teach only agriculture at this intermediate college, or are you going to teach other subjects like economics? —Agriculture, and allied subjects such as rural economics and agricultural chemistry.

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* Not printed.

60546. *The Chairman:* In answer to Question 20 (c) you say: "The steps I would suggest whereby the quality, grading or packing of agricultural produce may be improved, are those that will give those engaged in distribution themselves a name, in which case they will see that produce (*e.g.*, cotton of which I am speaking) of the right sort is pressed and packed. When I was a member of the Indian Central Cotton Committee I had occasion to see the very worst samples of pressed cotton, sent by the British Association for inspection, which might have yielded some profit to the intermediaries but which must have earned a low reputation for the new varieties grown in India." Will you tell the Commission what body you refer to by the title "British Association"?—That accosiation which concerns itself with the growth of cotton in the whole Empire.

60547. The Cotton Growers' Association?—Yes.

60548. You say: "I had occasion to see the very worst samples of pressed cotton, sent by the British Association for inspection": Sent where?—Sent to the Indian Central Cotton Committee.

60549. As a warning: is that it?—Yes, as a warning.

60550. Is it your suggestion that that cotton is not in fact exported from India?—No. But I have never seen such cotton ginned and pressed here.

60551. Would you go so far as to say that it was not exported in that condition from anywhere in India?—I think it was; only the ginning and packing have been extremely badly done.

60552. To that extent the association in question were serving a good purpose in bringing to the notice of the Indian Central Cotton Committee exactly what is required to improve the reputation of Indian cotton?—Quite true.

60553. Are you satisfied, on the whole, with the working of the Indian Central Cotton Committee?—No.

60554. Why not?—For this reason, that proper men are not included on the committee. The idea evidently is that there should be no criticism, whereas criticism and information are essential for the formulation of right ideas.

60555. Could you develop that a little? What type of men are you thinking of?—If there is a man who does enquire as to what is being done in Sind he is excluded, by reason of the fact that he has enquired; and similarly some of the best men here, those who know agriculture, are excluded from the divisional board.

60556. *Sir Thomas Middleton:* You told us that you tried two American cottons, 285 and 4F. How do those compare with the Egyptian cotton that you have tried some years ago?—We tried two kinds of Egyptian, the Metaffifi and Abbasi, both better than 285 and 4F. The Metaffifi commanded the market better than Abbasi; but these varieties have now been given up in favour of other varieties.

60557. That happened in Egypt?—Yes; and therefore we too have had to fall back upon the variety experimentally found to be the best, namely, Ashmouni; but the point is that all Egyptian varieties take about seven to eight months to ripen and we must, if we want to succeed, necessarily begin with them about the end of February or March. It is no use exposing them, before they have yielded, to dews that set in in the month of October; we have therefore given up cultivating Egyptian cotton. At an average rate, on a plot of eighty-five acres, I have succeeded in securing sixteen *maunds* an acre.

60558. Then it is the shortage of water which has made you give it up?—Yes.

60559. If you could get enough water to enable you to plant early, you would still grow Ashmouni?—I would grow Ashmouni most willingly. There is a minor inconvenience too: we do not know how to send our consignments to Europe and other places; but that is, as I have said, a small matter. Marketting could be organised comparatively easily if the cotton were available.

60560. You express yourself dissatisfied with your marketing facilities; I should have thought you were in a very good position to market?—We have to depend upon Messrs. Ralli Brothers and Volkart Brothers mostly.

60561. You have two competing merchants?—Somehow or other I have never been able to get more than three annas more per *maund* for American *phuttis*, and any profit that accrues to them is not, I know for a fact, shared by us.

60562. I suppose the reason is that the total quantity of American cotton which you can offer to merchants is so small that it does not justify a big increase?—A somewhat bigger increase is justified even now. For smallness of the quality offered there are two reasons: one is that the area which is put under American cotton is small for want of water; another is that the right variety is not selected. These two varieties. 4F and 285, tried here, are the varieties which have been developed in the Punjab; that is to say, crosses with some of the best American varieties. I do not believe in those at all. Acala seems to be far and away the best variety and that should be introduced in Sind; if it is introduced in Sind, I think very good results will be secured. Of course. deficiency of water supply remains a great difficulty.

60563. Where do you get Acala cotton?—It is at present being grown on the Sakrand farm and Dr. Mann promised me some seed.

60564. *Mr. Calvert:* You refer to the enforcing of the Usurious Loans Act; is that Act used freely in Sind?—In the form of the Deccan Agriculturists' Relief Act, which has had very injurious effects; I and Mr. Bhurgri started by charging no interest; but I found that my own outstandings in a decade amounted to more than two-and-a-half lakhs which I could not recover. If it is so risky to advance money one must necessarily charge interest, which is not really interest but a measure intended to reduce the risk, however inadequately. Such laws are bad laws, and should never be enacted; they ruin the credit of the people and make them dishonest.

60565. You say that these restricted tenures operate to reduce credit: is that based on actual experience of the Punjab restricted tenures?—I am not talking of restricted tenures.

60566. Lower down you say: "Measures taken to restrict or control the credit of cultivators, such as limiting the right of mortgage and sale, like Act III providing for the occupancy of lands on the Jamrao Canal in Sind on restricted tenure and not on capitalists' terms, operate, in my opinion, against the occupants by reducing their credit"?—I find that Act III, which has been made applicable, works badly. People then seek favours, and if the authorities are inclined to favour them, they are allowed to let their lands to contractors, but not to mortgage or sell them.

60567. But actually is it your experience that these Acts have reduced credit?—The Restricted Tenure Act too has reduced the credit of agriculturists; but it is to be distinguished from the Usurious Loans Act. The Act against usury has greatly reduced the credit of the agriculturist, and it encourages them to run away with advances.

60568. Are they actually borrowing less now than they were twenty years ago?—They try to borrow as much as they did before, but since they do not pay back, there is a disinclination on the part of the village *sowcar* to lend them money.

60569. But are they borrowing less money?—Their need is even greater since their lot has not improved; when they do not borrow, it is only because they cannot borrow.

60570. Then how do they get into debt if they cannot borrow?—They borrow but not as much as they require. The *sowcar* now charges them more interest, because they are more dishonest. The zamindar has necessarily got to do some cultivation and therefore he pays in the hope of getting his advances back. I think the Mahommedan zamindars are beginning to find that they are great losers in their advances to *haris*.

60571. *Dr. Hyder:* The cultivators of this Province, you say, run away owing money to the zamindars?—Yes.

60572. What are the reasons for the cultivators running away?—Desire to evade repayment stimulated by protective laws. I will take one instance. One *hari* with those depending upon him, has run away with four thousand rupees of mine. There were lately abnormal rains and floods in Sind. While my men did not know how to help themselves, this set bolted. Now my men have been after them and have found out where they are, but I do not know how to bring them back.

60573. I quite understand that, but only such a man would run away as possesses no rights whatever in the land; a man who has nothing to lose runs away?—But he had everything to lose; he shared with me the produce of the land cultivated by him.

60574. But he shared no rights in your land: he had neither occupancy right nor restricted right of any kind in the land?—I request that other tenures may be distinguished; I am speaking now of the zamindari tenure.

60575. The peasant proprietors do not run away?—They have been running away now on account of failure of crops. Their holdings being small, they run away to the Punjab. They come from the Punjab and they run away to the Punjab without paying their debts to the Government.

60576. They are Punjabis?—Mostly Punjabis.

60577. But your own Sindhi, a Sindhi who is a peasant proprietor, has something to lose and he does not run away; the *hari* owns nothing?—The Sindhi peasant proprietor will not behave differently. But there are no Sindhi peasant proprietors on my side. If there are any, they are very few. I am talking of the zamindari system.

60578. Under the zamindari system, since the cultivator has nothing to lose and probably something to gain by running away, he runs away?—Running away can do him no real good. If he only sticks to the land he cultivates he gets his share of the produce.

60579. Do you think that if he had had some rights in the land he would have run away?—Small rights in small pieces of land could not prevent his running away. I think we are, as a matter of fact, confounding ideas. It has from confusion even been suggested that the zamindari system should be abolished.

60580. I am not suggesting anything. On page 202, you say: "As far as possible, hereditary cultivators should be enabled to remain as cultivators." I want you to say what is in your mind when you make that statement?—The idea in my mind in making that statement is that they should be helped to retain their holdings as far as possible, and that the *banias*, the Marwaris and other people whose vocation is not agricultural, should not be able easily to replace them. On that account there should be nothing like non-terminable mortgages; a very fair opportunity should be given to those who advance their moneys to recover their moneys, while an equally fair opportunity should be given to the hereditary holders to continue to be hereditary holders.

60581. Let me pass to university teaching. You suggest that agriculture should be included as a course of study for the Intermediate Science and B. A. examinations?—Quite true.

60582. Is it to be as one subject or a body of subjects?—One optional subject.

60583. As one subject?—Agriculture as one subject.

60584. In answer to Question 16, you make the following statement: "Common pastures in villages are disappearing owing to encroachments for cultivation purposes. They should be restored." Supposing your suggestion were accepted, what would happen?—Supposing my suggestion were taken up, then pasture land and the best allied industry, *ghi*-making, would be provided everywhere for the cultivator.

60585. What about the food crops then: corn and other cereals?—There will be other land devoted to the cultivation of cereals, whereas these will be common pasture lands reserved for the animals owned by the cultivators of the village.

60586. At present, cultivation is encroaching upon these lands?—Yes; that is to say, nothing is being reserved for pasture.

60587. Supposing this tendency were checked, you would no doubt have pasture and grazing for your cattle, but do you not think you would be upsetting the equilibrium the other way?—The equilibrium between cultivation and pasture is now lost.

60588. There must be a reason for the loss of this equilibrium?—The cupidity of the cotton-grower, for instance, leads him to put as great an area under cotton cultivation as possible, oblivious of the requirements of his animal. Some land must be put under *bajri* and *juari* in order to provide fodder for animals.

60589. Have you a greater or a smaller cattle population than this Province can support?—The number of cattle is required, and should be what it is at present and even more, in order that the *hari*, when he is free, should betake himself to producing *ghi* and to breaking and aerating land.

60590. *Sir Chunilal Mehta:* It is very good of you to say a good word about the taluka development associations. I entirely agree with you that the unit should be smaller than the taluka. Do you think we should get the requisite personnel if we were to go lower down than the taluka?—Yes, village communities; the people in the village will be able to appoint their committees and the appointment of committees might be supplemented a little.

60591. How do you mean, supplemented?—By nomination. Some power of nomination should be given to the authorities. There should be likewise inter-village associations and then district and provincial associations.

60592. I am thinking now of a group of villages something smaller than the taluka. You remember you suggested it should be entirely non-official?—Yes.

60593. In the group of villages, do you think you would get the required type of men to form the development committee?—In the initial stages you may not get the required type, but that should not matter. When the system is there, in course of time it will improve.

60594. That is just our difficulty?—Yes.

60595. We wanted to go lower than the taluka; we have tried the taluka and I believe you think they have been fairly successful?—Fairly successful; and I hope there is a bright future before them.

60596. The idea is to go lower down in course of time. You suggested something about the missionary spirit; what do you mean by that?—I and my Professors developed the Civil Engineering College and the Law College; I presided over the Civil Engineering College for one year; we did not have any extra remuneration. Then we promised to do our best for the agricultural college without any additional remuneration.

60597. I see; that is what it means. In that smaller group of villages which you would take as your unit, do you think you would have somebody staying in the villages?—Only those who do stay in villages should be members of such committees.

60598. Do you think it would be necessary to import any people from outside to stay in the villages?—No.

60599. You do not think that would be necessary at all?—I do not think it would be necessary or desirable.

60600. You could find the men from the villages themselves?—Easily.

60601. *The Raja of Parlakimedi:* As a zamindar, what are you interested in for the improvement of indigenous agriculture?—I am most interested in the improvement of indigenous cotton, next to that of indigenous wheat, and next to that of indigenous *bajri* and *juari;* and then of the indigenous leguminous crops too. When I had the water I was very much interested in the cultivation of *berseem.*

60602. As far as you personally are concerned, or for the general improvement of your surroundings?—For both. I believe that there are chiefly two

things necessary for the prosperity of agriculture in Sind: water and the habit of breaking and aerating the soil.

60603. My point is: have you been interesting yourself in the general improvement of the country?—No, I could not claim that I have exerted myself in the cause of the improvement of the agriculture of the country.

60604. But, as far as the country accessible to you is concerned?—Yes, I have done my best.

60605. In what ways?—In improving my cultivation; people then come, have a look at it and follow the same methods.

60606. Have you been helping them to secure the improved strains of cotton seed or wheat?—Where is the seed available? We have gone without any good seed during the last two or three years. Although there are seed stations, we have had no help from them. We have sown very bad seed even of 285 and 4F, so that when you go to a cotton field you see Sindhi *deshi* cotton growing along with the American. We cannot get good seed anywhere. We want the Agricultural Department to know our needs. Without this knowledge the experimental stations or demonstration farms will not be of much practical utility.

60607. Have you attempted to approach the Agricultural Department to educate them?—I know men in the department fairly well, but still I think some time will be taken to persuade them to utilise the experience of the practical cultivator. It will come in course of time.

60608. You have taken opportunities to discuss important factors with the department?—As a matter of fact, discussion is not courted. At times I have had to inflict my views upon them, but, seeing that useless, I have not for some time past attempted to do so; I have kept my views and my experience to myself.

60609. Then as far as animal husbandry goes, what interest do you take?—There is no veterinary organisation in my tract. For instance, I produce a lot of mares, but good stud-horses are not available, and when pests break out there is no help. There should be an organisation, but there is none.

60610. Have you approached the Government on that point?—I do not think the Government would fancy my approaching them thus. I do not see any desire anywhere to establish a kind of interchange of ideas between the cultivator and the administrator. The Executive Engineer would take it very unkindly if I went frequently to represent matters to him. As I have said, even periodic consultations are rare, and therefore much of the advantage which might accrue to the people from the large outlays of Government on agricultural and other schemes is lost to the country. The establishment of village communities and then interchange of ideas between the village communities and the authorities and research workers is essential; without it much improvement cannot be brought about.

60611. As far as cattle are concerned, what work do you do?—With regard to cattle, I want bulls on the one hand and the services of a Veterinary Surgeon on the other.

60612. Are you interested in creating any special breed of cattle?—We have splendid breeds but we do not make any special arrangement for breeding.

60613. Are you in favour of selecting cattle for perfection in a certain strain, or by hybridising to create a dual purpose animal?—But the refinement of breeds will be a luxury.

60614. You have already got very fine cattle here?—They are owned by those whose business it is to get a living out of milk and by-products of milk. I have yet to see a zamindar or a cultivator in Sind who has gone in for selecting his animals.

60615. With regard to fragmentation, you propose that disputes should be settled by panchayats. Are you satisfied with the work that the panchayats do in other spheres of life?—They are in a very bad state now, but at one time, as a student of history you know, they were well organised.

We might go in for necessary modifications in them now, having regard to the conditions under which they have to be made to work.

60616. *The Chairman:* They were spontaneously organised in the village; they were not imposed by any authority outside the village, were they?—But the organisation has disappeared under the stress of the democratic ideas which come to the East from the West, so that now a kind of compromise is required.

60617. You do not think the increased communications have had something to do with it?—No, I do not think so; the villages are in a bad condition from other causes.

60618. *Sir James MacKenna:* What is the Acala type of cotton to which you referred?—It is longer stapled, silkier and less amenable to pests.

60619. Is it Egyptian or American?—American.

60620. Where does it come from?—The seed was directly imported from America.

60621. By Mr. Henderson probably?—By Dr. Mann.

60622. So that it is quite recent, is it?—Quite recent.

60623. What sort of staple is it?—It is about one inch and more, and silky and white, and the proportion of lint in it is also greater.

60624. Do you think it is a good type for Sind, or worth following up, anyway?—Of course, some little further experiment must be made but it seems to me to be a good one.

60625. *Professor Gangulee:* Am I to understand that the entire area of 4,000 acres under you is cultivated by *haris*?—No, less than one-tenth; although I own that much land, I am not able to put more than 600 or 700 acres under any crop.

60626. But the area you do cultivate, you cultivate through the *haris*?—And by myself too.

60627. What portion of the total area do you cultivate as your home farm?—In the existing conditions I have cultivated about 150 acres myself.

60628. And that by the employment of labour?—Yes.

60629. Paying them cash for their work?—I have two methods; I pay them a certain amount per month and I also give them a share, such as labourers receive usually from the *mujeris*.

60630. Who are the *mujeris*?—I shall explain. There is the zamindar, then, underneath him, the *mujeri* (managing cultivator); then the *hari* (labouring cultivator), and then the labourer. It is wrong to think that anyone who holds about twenty-five or thirty acres does the cultivation himself; he too will employ labourers. So that the smallest unit is the labourer; then the next unit is the *hari*, the next unit the *mujeris*, and the next the zamindar. I do away with *mujeri* and the *hari;* I employ the labourer and that is doing cultivation on my own account.

60631. Do you grow wheat on your land?—I am not able to grow wheat because water is not available in the month of October. Wheat has to be sown between the 25th October and the 15th November.

60632. But you did grow wheat: you had Pusa wheat, did you not?—I grew Pusa 12 and two Punjab varieties, a beautiful variety of Larkana, a white variety from Delhi and the Sindhi *Kahno* (a long bearded variety), from which preferably the Italian macaroni is made.

60633. These varieties you have obtained from the Agricultural Department, have you not?—No, I got them myself.

60634. Have you appointed any supervisor to supervise the work on your farm?—I have fourteen or fifteen supervisors.

60635. Are they salaried men?—They are salaried men.

60636. What sort of training have they?—My college provides no agricultural training. I am the head cultivator. I am the trainer.

60637. None of your students are attracted to such training?—No, because those amenities which are sought by the educated people are not available on my land.

60638. You have interested yourself in agricultural education; have you tried to attract any of your students to farming on your own land?—I am sure I could attract youths if adequate opportunities were afforded me.

60639. Could you not give them a piece of land and say: "Come and farm here"?—No; in the first place, my conditions are so imperfect that I could not attract them without some special aid from Government and the local bodies.

60640. You have got the land?—Yes.

60641. You want to impart agricultural education for the benefit of your Province?—Yes.

60642. You have control, to a certain extent, over the students here, being the Principal of an important college; what are, then, your difficulties?—My first difficulty is that I do not know how to live in fair ease and comfort, nor do the cultivators, on account of inadequate water supply. Secondly, in my villages there are no *pucca* houses, no dispensaries, no schools and no hospitals. I wanted to go in for mosques and temples but Hindus and Mahommedans have begun to fight; mosques and temples cannot well co-exist.

60643. Without these amenities to which you refer, agricultural education would be of no use?—No, that would be a wrong answer. If agricultural education of the right type were given, and the people realised the value of agricultural industry, then help would be forthcoming from inside and outside in the correction of the defects from which we are suffering.

60644. You have given us a ladder of associations, beginning from the village up to the Province, and you state that these associations are to be managed by non-officials. Do you see any non-official agencies at the present time which are able to undertake this?—If you will excuse my plain speaking, the associations have not been allowed to come into existence, and hence no associations.

60645. What do you mean by "not allowed to come into existence"?—On one occasion, I was appointed vice-president and on another occasion president of an association. The secretary on each occasion was sent for, and enquiries made from him as to whether he was going to continue as secretary. Then he probably apprehended bad results accruing to him from his continuance in office, and he sent in his resignation. We never operated even on one occasion.

60646. But the taluka development association is essentially a non-official organisation which receives assistance from Government?—The association is receiving assistance, and I am requesting the authorities to develop it. With its help research will become real, demonstration will become real, and the financial condition of the *hari* will be bettered.

60647. It is not then true that the Government discourage the formation of non-official organisations?—Hitherto they have discouraged it; there is no doubt about it.

60648. But there are the taluka development associations?—This is the most recent development; I am thankful for its creation, and I shall be thankful for its development also.

60649. What comments have you to make on the organisation and working of the taluka development associations?—Just one, namely, try to get hold of those men who combine intelligence with character. Characterless people will not be able to do much.

60650. That is an utopian idea. I want to know what is the present criticism you can offer with regard to the organisation and working of taluka development associations?—According to me, utopian ideas have occasioned useful realities. I feel that it is on the strength of benevolent utopian ideas that we come to be rightly practical.

60651. Do you think that the cultivator has found a friend in an organisation like the taluka development association?—The cultivator is finding a friend in the taluka development association and in the co-operative movement.

60652. Are you in touch with both these organisations?—Yes, to a certain extent.

60653. You told us something about the missionary spirit. Do you find that missionary spirit among the students?—I think it could be easily evoked.

60654. It should be evoked. It is not there?—Because it has never been evoked. It is there potentially.

60655. On whom lies the responsibility of evoking that missionary spirit?—I always feel that the responsibility is shared by two, the people to be summoned to co-operate on the one hand and the people who have power to summon them on the other.

60656. In answer to Question 6 (*iii*) (*c*), you refer to hereditary cultivators. Are you really referring to *haris*?—*Haris* and zamindars.

60657. When you say hereditary cultivator, the actual cultivator in this Province being the *hari*, you are really referring to the hereditary *hari*?—My view is different. I consider myself a cultivator in the truest sense of the word. Although, here before you, I look highly urban, I feel that I am primarily an agriculturist.

50658. We appreciate that. I wanted to know whether, when you say hereditary cultivator, you are really referring to the zamindar or to the *hari*, the actual cultivator?—I am referring to both.

60659. Do you believe in the magic of property?—I am not a Bolshevist; I do believe in property.

60660. You hazard a statement with regard to the Deccan Agriculturists' Relief Act and say that it is a bad law, but you have not stated your reason?—The reason is quite simple. By such laws you make people dishonest. You give them opportunities to run away and evade payment.

60661. That is your criticism?—That is my criticism.

60662. It makes people dishonest?—Yes, and lowers, therefore, the credit of those who do require money.

60663. In enumerating the causes of dishonesty, you speak of bad moral and spiritual training. Will you please explain what you have in mind?—I have to thank you very much for this question. I feel that no agricultural organisation will be truly beneficial if it does not take care of the morals of the cultivator. It is on that account very desirable, as I have already stated, that there should be, in villages, schools, dispensaries and mosques and temples. Arrangements ensuring physical health, mental health and moral health must be made in each village.

60664. You say that all research should be centralised. Do you mean that it should be financed by the Government of India?—I have divided research into higher and local research. I say that higher research ought to be centralised, for duplication of research in different Presidencies will only lower the standards of research; and then, when we come to adapt the expert advice of the central institutions to local conditions, local organisations for research ought to be carefully developed.

60665. You make a reference to rural economics. Is that subject taught in your college?—No agricultural subject is taught in my college.

60666. Is economics taught?—Economics is undoubtedly taught, but not with special reference to agriculture, just as botany and biology are taught, but without special reference to agriculture.

60667. Even without special reference to the Sind flora?—Even without that, because the laboratory is inadequately equipped, and the Sind flora are not a prescribed subject for any university examination.

60668. Your attention was drawn to what you call the pathetic sight presented by a B.Ag. selling boots and shoes as a shop assistant. Why

should you consider it pathetic?—Because, if special training has been acquired and if no opportunity is offered for utilising it, it is a pathetic circumstance.

60669. And yet, you are in favour of creating more B.Ag.'s?—I am in favour of creating more B.Ag.'s for research work and for the management of certain farms. What I am most concerned about is the practical training which is required in the case of the cultivator.

60670. You say that a special educational cess should be levied?—Yes.

60671. Do you think public opinion in your Province is in its favour?—I would not content myself with the existing public opinion. I would educate it, whenever necessary. The special cesses for the organisation of villages on the one hand, and for the provision of higher and technical education on the other, should be levied, and the zamindar should be made to pay more than he is paying just now.

60672. Compulsorily?—Yes, compulsorily.

60673. You bring a charge against the agricultural demonstrators, and say that the demonstrators should restrain their autocratic or snobbish tendencies of behaviour. Have you any experience of demonstrators in this Province?—I have some. Very few may have misbehaved towards me, but they do towards my cultivators, and that is not as it should be. I am only indicating that more sympathy is necessary and some more human fellow-feeling is required for making demonstrations truly useful.

60674. Did you talk the matter over with any demonstrator?—If my views are not sought, I do not offer them. My experience has pointed to the fact that one is viewed with disfavour for giving a free expression to one's ideas. I have been out of the Central Cotton Committee simply because I spoke out to help the growth on right lines of the Agricultural Department here, and I am not on the divisional board, because criticism, however just, is not appreciated.

60675. You say that Government should pay more attention to the establishment of industries connected with agriculture. Have you any scheme for the Government?—Yes, I have a scheme. I spoke of the *ghi* that could be produced by each *hari*, worth about Rs. 40 or more a season. I would recommend the production of jaggery and the pressing of oils, and, to a certain extent, weaving too, by the *haris*. I do not seek to attach that importance to hand-weaving which is attached to it by some, because I do not like that the agriculturists should be drawn away from agriculture proper. If they are free for four months in the year, they should take care to plough their land dry, aerate it, and they will thus get more than they ever can by migrating to other places or undertaking other labour.

60676. Is it your suggestion that Government are not aware of the possibilities of such industries as you have just mentioned?—Government are aware of them, but I wish Government would consult the cultivators more and aid them to pursue these industries.

60677. By cultivators, do you mean the men who cultivate the land, or the zamindars?—I have said that I think certain zamindars to be cultivators in the truest sense of the word, and these I include in the term "cultivator."

60678. *Mr. Kamat:* Speaking about the Deccan Agriculturists' Relief Act and its practical working, you told one of my colleagues that it has spoiled the morals of the cultivators, that it is a bad law. I should like you to clear up that point from your practical knowledge?—Protected by the Act, the cultivator avoids repayment of loans, which leads a zamindar like myself not to make advances without interest, which is bad for the cultivator. If I cannot help myself, too, when my money is taken away, and if I have no remedy, then I must secure myself against risks.

60679. Is it not the case that after the passing of this Act, as a rule, the *bania* or the *sowcar* instead of taking a mortgage deed from the cultivator insisted on having a sale deed of the land, no matter what the value of the land, if the cultivator wanted even a small loan?—To a certain extent that is true.

60680. It is not also a fact that the needy cultivator passes the sale deed, with a promise that he will get back that land on repayment, although that promise is generally a bogus one on the part of the *bania*?—In a few cases, even that does occur.

60681. Have you noticed cases in which, although the cultivator makes a faithful promise of repayment, he knows the transaction is a bogus one from the beginning, and wants to have his revenge on the *bania* and never pays back anything at all?—Quite true.

60682. And he then rushes into court asking equity from the court, although at one time he wanted to have justice?—Quite true.

60683. And this has spoiled the relationship between the cultivators and spoiled the morale of the people to such an extent that no one trusts them?—Perfectly true.

60684. As an experienced Principal in charge of a college, would you tell me if there is a tendency on the part of the students in these days to take to agriculture as a profession, supposing all the necessary facilities, land, etcetera, were afforded them?—They would be eager to take to agriculture.

60685. What difficulties do they at present have?—There is no land available, and no agricultural education.

60686. In this Province, do you think there are avenues for the educated middle class man to make a living by serving as a sort of middleman, by taking up land from the zamindar and cultivating it and making a decent living out of it?—Yes. A middle class man can make a decent living in that way, provided water is available.

60687. The difficulty is not the disinclination on the part of the men, but the actual difficulty of getting sufficient water?—Yes.

60688. If a *hari* can make a living out of the land, why should not a matriculate make a living out of it too?—He can very easily do so.

60689. Where is the difficulty? Is water alone the difficulty?—According to me, that is the only difficulty.

60690. When the Barrage comes in, and water and land are available, it will afford a fair opening for the matriculate youth in this Province to go into land as a profession?—Yes, provided the preliminary requisites are attended to at once. The banks of the different canals must be raised at once; otherwise, water, even if it is available, will not be used. I am very eager to use water in the months of April and May, but because the banks are low I cannot do so, even when the water is available.

60691. You are speaking of existing difficulties, whereas I am envisaging the time when there will be no such difficulties, under the new Barrage system?—I want to point out that there is a danger of these difficulties continuing.

60692. But these difficulties would be common to other professional agriculturists?—Quite true, but to attract educated lads, these difficulties should disappear.

60693. In any case, with these common difficulties, you think there is a distinct opening for the educated middle class young man?—Yes.

60694. On page 202, you say: "As far as possible, hereditary cultivators should be enabled to remain as cultivators." What do you mean by "hereditary"?—According to me, it means one who is engaged in the work of cultivation for some considerable time.

60695. If there is a tenant, he should have some sort of security that he will not be turned out at will; is that what you mean by the word "hereditary"?—I have used that word in connection with non-terminable mortgages. You also referred to some bogus arrangement between the borrowing *hari* and the capitalist. I say, these ought to be stopped. While reasonable facilities for the recovery of his advances should be afforded to the capitalist, any bogus agreements ought to be put an end to, so that those who wish to continue as cultivators may do so.

60696. On the general question of the relationship between the zamindar and the *hari* in this Province, have you anything to suggest to improve the position of the *hari*?—The relationship existing now between the two is very good; it is unnecessarily sought to be made out that the relationship is bad.

60697. Do you mean to say that the *haris* are getting, in the conduct of their profession, as much good treatment from the zamindar class as they should?—They are treated as children, so far as I see, by some; I do not say by all.

60698. I know, of course, that there must be some good people who treat their tenants well, but as a general rule is that the case?—As a general rule, on the Jamrao (I can speak confidently of things as they obtain in the Jamrao tract) there are many men who treat the *haris* well. Take for instance, Mr. Bhurgri, who was there a zamindar on a large scale. When he was alive I think he attracted *haris*, and he dealt very fairly by them.

60699. I know there are some enlightened zamindars who do conduct their business as landlords precisely in the same enlighted manner as, for instance, a landlord in England of the aristocratic class takes care of his tenants, who has the desire to improve his land, carries on scientific improvements, and gives the fairest possible treatment to his tenants. While that may be quite possible in the case of certain enlightened zamindars in this Province, in the case of those who do not behave in this manner have you any suggestions to make?—I think some restrictions should be imposed upon zamindars who maltreat *haris* and it is only right, in the interests of society, that that should be done.

60700. *Dr. Hyder:* What kind of restrictions have you in mind?—I have not thought out the matter, so that I could not say that I have a programme yet. But I can think it out now and tell you. If a man does not look after his agriculture properly and misbehaves, then the village, the inter-village, the taluka, the district and provincial organisations should sit to consider whether he should not be deprived of his property in the interests of society itself.

60701. That would be a revolutionary change?—Yes, but I have always fancied the principle underlying Bolshevism. Although the details may be objectionable, this much of the principle is, according to me, to be accepted.

60702. *Mr. Kamat:* Would you be in favour of any law as regards tenancy?—I feel that some enactment is necessary in the case of Sind. 30,000 acres, 40,000 acres, 50,000 acres, all gathered together in the hands of one individual will not, I think, be conducive to public welfare; it will lead to disaffection. So, there must be some limit to the size of the holdings, although the holdings should not all be small.

60703. But that sort of condition exists in other countries too, for instance, in England?—I think in the bulk of the property which is not managed personally by the zamindar, the *hari's* status should be improved. He may be made not quite a tenant at will.

60704. To pass on to another point, are you in favour of the introduction of the Punjab Land Alienation Act into Sind?—I am against it. It will divide the Hindus and Mahommedans, and it will kill the small holder. It will be most uneconomic.

60705. *Mr. Calvert:* Has it killed the small holder in the Punjab?—According to the private information I derived when I attended the Science Congress, it has not proved a good measure, but the official report is that it is a wholesome measure.

60706. Has it divided the Hindus and Mahommedans in the Punjab?—It has, to a certain extent, and it will be dividing them still more. I am definitely of this opinion. Look at the relations subsisting between the Hindus and Mahomedans in the Punjab. One cause of the division is this Act.

60707. *Mr. Kamat:* Did you notice a strong division of opinion as regards this Act in the Punjab?—My friends gave me a very bad account of the working of the Punjab Land Alienation Act.

60708. *Mr. Jamshed Mehta:* On page 202, you are referring to the restriction of the agriculturists' credit by the Deccan Agriculturists' Relief Act and other Acts. There must have existed certain difficulties when these laws were made. Otherwise, these laws would not have been found necessary?—I am not unmindful of that too. I feel that the village *sowcar* must behave well, and that there should be some method of correcting him. The co-operative movement will be a great corrective, but I do not understand why it should be supplemented by special measures.

60709. Supposing these laws were abolished, what other suggestions would you make for seeing that on the one side the *hari* and on the other side the *sowcar* remains honest?—The agency of the village, inter-village, taluka, district, and divisional associations will be very useful.

60710. Is it your opinion that the village *hari* has become more dishonest since the introduction of these Acts? Or was he dishonest before that too?—It will be improper to make any dogmatic statement, but I feel that he has become more dishonest in consequence of these special measures.

60711. Are a large proportion of the *haris* dishonest, or only a small proportion? Do you find such instances only here and there, or are there many instances?—I think they are general. Everybody is experiencing this trouble, Hindus and Mahommedans, and large and small landholders.

60712. With reference to your answers to my colleague on the question of the Punjab Land Alienation Act, did you only hear of its ill effects, or have you seen with your own eyes that it has done harm to the small holder, or that it has created trouble?—I could not offer any personal testimony.

60713. You do feel that if it were extended to Sind, it would create results similar to those which you have heard exist in the Punjab?—Yes.

60714. Is it from any logical thinking that you have come to that conclusion, or is it simply because you have heard that it has had bad results in the Punjab?—My mind, when brought to bear upon it, makes certain suggestions. If you prevent a man from selling his property to one who will be considered as a non-agriculturist, then he will necessarily be confined in his sales to men of his own class; and he will not get the market price for the land he sells. Once again, land will then accumulate in the hands of a few, and the evils which attach to large holdings will attach to the holdings that will come to be so created.

60715. How would this create trouble between the Hindus and Mahommedans?—An attempt will be made to classify Hindus as non-agriculturists. That is how it has been done in the Punjab.

60716. *Mr. Calvert:* Are not the vast majority of the Hindus in the Punjab classified as agriculturists?—I must say a large section; the Jats especially. I do not know whether the same thing will happen here; if the same thing happens here, the evil of the Alienation Act will be reduced to that extent.

60717. The vast majority of Hindus in the Punjab are classified as agriculturists?—Some.

60718. The vast majority?—That is not my information.

60719. Five-sixths of them are so classified?—I must accept your figure, because you know better. But then what will be the object of the Alienation Act in Sind.

60720. *Mr. Kamat:* Are those outside the five-sixths classed by administrative sanction?—Evidently.

60721. *Mr. Jamshed Mehta:* On page 203, you say: "The existing methods of distributing canal water to cultivators should be made uniform". What do you mean by that?—Take a canal. Not only the first thirty outlets of it should be moduled but the rest too. I say this is a bad system of moduling. How will you possibly secure reliable results if in some cases there are modules and in other cases there are none. If you want to find out whether moduled outlets are really good, then you must have them all over the canal.

60722. Are you in favour of modules?—I am in favour of them, if they can be properly worked; but if the unequal manner of working these outlets continues, then I think it is best to have open head *karias*.

60723. Do you think a module would be suitable for the rice crop also?—I am a believer in modules, provided, of course, they are properly worked.

60724. On page 203, you make a statement that, in certain instances, water at the tails is superabundant. Have you seen that yourself?—I have seen it myself.

60725. What is the reason for it?—This is the reason: it being an accepted principle with the Public Works Department, now, that water must be provided for the tail the subordinates turn it into a lucrative source of income.

60726. Have you come across any zamindars who improve the housing condition or the educational condition of the *haris* generally?—I have known of none; not even one. The reason is that the zamindar themselves are badly off.

60727. You are in favour of an agricultural college for Sind; why do you want it?—I am in favour of one first grade college and three intermediate colleges, one situated in Karachi, another in Nawabshah, and the third in Sukkur.

60728. With a view to induce educated young men to take to agriculture?—Educated young men are ready; all they want is land.

(The witness withdrew.)

Rao Sahib UDHARAM SHEWAKRAM, Zamindar, Guni, District Hyderabad.

Replies to the Questionnaire.

QUESTION 1.—RESEARCH.—(*c*) I suggest that more attention should be paid to research in the direction of indigenous crops like the paddy, *bajri* and *juar* with the object of increasing the outturn per acre of these crops. One reads of the average produce of paddy per acre in Italy or in Spain as being thirty *maunds*, whereas it is only ten to twelve *maunds* in Sind. The favourable conditions that give so much produce elsewhere may if possible be introduced here. The impression is abroad that Government devote more attention to cotton and wheat crops that are exported abroad than to those which are consumed in India.

QUESTION 2.—AGRICULTURAL EDUCATION.—(*i*) No.

(*ii*) All districts in Sind require extension of teaching facilities which are absent especially in rural areas where agriculture is universally practised.

(*iii*) Yes, if possible.

(*iv*) The attendance in several areas is very thin. The agricultural class especially takes no interest in educating their children. The reason is, first, that no education is imparted in the agricultural subjects which may benefit the boys in their future avocation of agriculture to which they have to turn for their whole life; secondly, the parents are too poor to spare their children for any other engagement than their own domestic or agricultural wants. As soon as a boy is five or six years of age he is turned to attend to the grazing of the family cattle. As soon as he is ten or eleven years old he is turned to attend to the ploughing of his field and doing other jobs connected with the crops his father usually raises. To induce parents to spare their boys for sending them to the village school the hours of attendance must be changed in such a way that the boys may be able to help their parents in the daily avocation of their life as also to gain experience for themselves in their own line of agriculture by practical work in the field. The hours of attendance should be from 2 p.m. to 5 p.m. after return from their morning work in the fields and again from 8 p.m. to 10 p.m. after return from the evening work. Monthly competitive scholarships from three rupees to ten rupees a month should be given to about ten boys in each class to serve as an impetus to the parents to spare their boys until a taste is created in them to recognise the value of educaton in their children. Education in agricultural subjects should be introduced in each class so as to create a taste for high farming of the crops actually cultivated in the locality. To finance this scheme an additional assessment of one anna in the rupee of land revenue should be levied for the purpose of primary education in rural areas, earmarked for agricultural education.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(*a*) The measures of demonstration that will succeed effectually in influencing and improving the practice of cultivators will be the conduct of demonstration connected with the actual crops raised in the locality, in the fields of that locality, by the Department of Agriculture, so that the cultivators will see for themselves the results of such demonstration under-existing conditions in their own fields and will very easily see the points of difference between their own practices and those of the demonstration plots. This will be an object lesson which will carry conviction and induce ready adoption. For demonstrations to work effectively and yet economically I should suggest that each taluka Inspector of Agriculture should select a typical field in a zamindari wherein to conduct his demonstration by cultivating the same paddy crop on the improved system side by side with the cultivator's field cultivated on the prevailing system. The zamindar should be given, in return for the use of his land, that proportion of the produce which he would reap from his own cultivated field. This will be economical to the

department conducting the demonstrations and more effective as an object lesson to all the peasants of the village who can observe all the processes of improved cultivation.

QUESTION 4.—ADMINISTRATION.—(*c*) (*i*) No. The departments are not manned by a sufficient number of workers. Each taluka must have sufficient workers to cope with the large area in charge. The members of the staff are in themselves not experts in the crops they have to handle for demonstration and therefore not capable of showing results better than the existing unsatisfactory ones.

(*ii*) There is great need of feeder lines to penetrate into the interior of agricultural tracts.

(*iii*) Roads are extremely bad and unfit for traffic. Motors cannot ply on them with saefty. The taluka local board funds are too meagre to cope with proper repairs and upkeep of roads. Greater grants from provincial funds should be given to each taluka local board to help in the upkeep of proper roads.

(*iv*) The reports of the Meteorological Department such as are issued from Simla are not broadcast freely to reach rural areas. Arrangements should be made to post up daily telegrams at each taluka headquarter for diffusion of weather information to all the zamindars.

(*v*) The Postal Department is run too much on financial and profit considerations. There ought to be free postal delivery in all the rural villages, at least every second day. The post office refuses to make delivery of post even when a village has undertaken to make good any deficit the department may incur in arranging such delivery. The needs of rural people are never cared for by the department. I strongly advocate free postal delivery in almost all the big villages in rural areas.

(*vi*) The telephone service has been introduced by the Public Works Department in some talukas for their departmental use. I should suggest that this service should be kept open for the use of the agricultural public for two or three fixed hours in the day at a nominal fee of two annas for five minutes talk so that zamindars may be able to make enquiries from headquarters about weather conditions and prevailing rates of grain in the market so as to guide them in their sales of produce and in other affairs, to improve the amenities of rural life. The benefit of this telephone service may be extended to those zamindars who may wish for a connection with their own field quarters and they may be charged the actual cost of such connection with a nominal fee for its regular daily use. This will help in forming a link between rural and city life.

QUESTION 5.—FINANCE.—(*a*) My views regarding the financing of agricultural operations are that mortgage banks should be started to afford easy and convenient loans to agriculturists at interest of not more than six per cent per annum. The zamindar at present pays twenty to twenty-five per cent. interest to the local *bania* who finances him and the interest charges swallow a large part of his meagre produce. The zamindar should be given enough money to finance all his *haris* who do actual cultivation on the *batai* system, as these *haris* are charged twenty-five to thirty per cent by the *bania* and they find that a large proportion of their produce is absorbed in interest charges. In financing his *haris* the zamindar should be bound to charge his *haris* not more than nine per cent, three per cent being allowed to him to cover the bad debts which will inevitably occur. This will save the vast proportion of the actual tillers of the soil, who need relief most, from starvation.

(*b*) The Government system of *taccavi* is worked with stingy hands; only nominal amounts are given and those amounts only to a very few zamindars; the rules of recovery are also too stringent. The subordinates in handing over amounts of *taccavi* make exactions so that in the long run the interest swells nearly to what the *bania* charges. *Taccavi* should be given more liberally and free from exactions.

Rao Sahib Udharam Shewakram.

QUESTION 8.—IRRIGATION.—*Foreword.*—Irrigation is all-important for cultivation in Sind as the mighty river Indus supplies immense quantities of water for irrigation. Cultivation on rainfall is insignificant, the average annual rainfall being only five or six inches. After forty or fifty years of correspondence Government have at last undertaken the vast scheme of the Lloyd Barrage and canal construction works which are intended to supply a perennial, constant and assured supply of water for irrigation, almost of all of it flow irrigation. These works will remedy the defects of the existing system of irrigation. The defects were those of non-perennial supply, lift irrigation, the level of water always varying, the supply never being assured for the full period required for maturing the crops. Government is to be congratulated upon this vast scheme; but this Barrage scheme does not embrace the whole of Sind; it leaves out of its operation and benefit the southern portion of Sind, comprising the whole of Guni, Badin, the major parts of Tando Bago and Hyderabad taluka in the Hyderabad district and all the seven talukas of the Karachi district, this being the non-barrage zone. The area of fully developed and cultivated land in this zone is nearly one-sixth of the whole of Sind; it consists mostly of natural gravity flow land cultivated annually, mostly under paddy cultivation and yielding annually revenue to Government to the extent of about 20 lakhs. The Commission may enquire what the actual annual cultivated area and the assessments are. The Lloyd Barrage, by cutting off the level of the Indus below it, is surely going to have a very adverse effect upon this non-barrage tract; the natural-flow rice lands will be converted into lift lands and these, being low and swampy, will be unfit for *kharif* lift crops and will therefore go out of cultivation. The non-barrage flow rice areas will not only be converted into lift but the duration of the supply of inundation water to them will be shortened by about forty days, twenty days in the month of June and twenty days in the month of September, both critical months of the season, so that the variety of the crops usually matured would not mature on the short-lived supply. Lower Sind zamindars consider that the Lloyd Barrage will ruin their lands and their crops. The water supply for winter crops from the only existing perennial canal in Sind, the Fuleli, will be cut off by the barrage; this will render the raising of winter crops impossible. The damage to Lower Sind will be immense; Government should realise the magnitude of this and should resort to early measures to remedy this evil. The economic loss to the zamindars will amount to crores when their valuable lands, which have taken ages to be improved and made cultivable, will have been ruined. It is no use waiting and see their ruin and then adopting remedial measures.

(*a*) (1) For reasons given above I advocate the building of another barrage with canals on both sides below Kotri for the benefit of the non-barrage area, so that a high level of water for flow cultivation may be maintained and the same advantages of perennial, constant and assured supply secured to this area also. Besides this, the waste of water which now occurs from the Indus to the sea will be stopped and water will be utilised to the best advantage.

(2) I also suggest the early construction of the Mehrani Canal for which administrative sanction has been given by the Bombay Government and for which estimates and plans are already before Government. This canal will remove deficiency of supply in the Gaja system and also open out vast areas of rich cultivable lands lying in the south of Guni taluka. Nothing will improve the economic condition of the cultivator more than an adequate supply of irrigation water which should be available throughout the year both for summer and winter crops, should have a constant level throughout the year, should give flow irrigation and should be assured every day of the year in any quantity required for the crops. Given these conditions, all the ills of the cultivator will be removed by one stroke. If the cultivator can grow both summer and winter crops he will have no slack season; he will have enough and abundant crops to live upon, he could cultivate recuperative crops in winter to enrich his soil without manure, so that

there would be no need for the solution of the problem of his indebtedness; his prosperity would be assured and Government would be spared all anxiety about his welfare. I therefore advocate in Sind especially the opening of new irrigation works with barrages, regulators and other engineering devices, because the capabilities of the Indus are very great and it only requires to be harnessed. The question of the poverty of the agriculturist will then be solved. The difficulties in the way of the extension of irrigation facilities in this Province are want of a bold policy of Government and the lack of funds for such works, though Government even now do it very well. Almost all Government irrigation works are paying adequate interest to Government and should be extended and carried into every nook and corner of the Province.

(*b*) Before I offer my remarks regarding the existing methods of distribution of canal water to cultivators, I would beg permission to press upon the attention of this Commission the widespread complaint of zamindars of Sind, concerning the inefficient way in which the Government canals are maintained by the Irrigation Department. The river Indus carries a large amount of silt which gets deposited in the beds of canals and which has to be removed before the inundation season to enable the canals to draw a sufficient depth of water. Even when the inundation is the lowest, the deeper the cleared bed the more efficiently will the canal draw a discharge of water to cope with the requirements of cultivation. In discussing this subject of clearance of canals I cannot do better than quote, verbatim, the following paragraphs of a petition dated the 30th September 1925, submitted to the Collector of Hyderabad, by the Zamindar Association, Tando Division, on the subject of clearance of canals:—

> "I will take this opportunity of drawing your attention as forcibly as I can to the obligations under under which Government lies, for spending a certain definite percentage of the land revenue of the Province of Sind on the clearance and the improvement of the Government canals. These obligations have been utterly forgotten and because they have been forgotton for a good long time, I venture to think that the more reminders my association addresses to Government, the more effective they will be in procuring sufficinet funds for canal clearance. I am, therefore, taking up the old history to remind Government of the obligations they incurred in the long past, which have been buried in oblivion, but which they have to observe faithfully now.

Colonel Merewether, the Commissioner in Sind, wrote in his Report No. 1260, dated the 8th April 1874 as follows:—

> 'The management of canals will best be left to the irrigational establishment in communication and co-operation with the revenue officers. Irrigation is now being better arranged for, than was ever intended before, and in a few years with sufficient funds put at the disposal of officers, the main feeders should only be cleared by Government. In the time of the Amirs this was done by statute forced labour. We abolished that system as most vexatious, which it was, and in place of labour, we took a certain amount per acre of cultivation under the name of *hakabo* or water rate, such as was reckoned to be necessary and sufficient to keep the Government canals in efficient order. To prevent the zamindars being harassed by a number of rates this *hakabo* was merged in one sum taken as land revenue and was included in the terms of settlement.
>
> The *hakabo* with a revenue of nearly thirty lakhs derived solely from canals amounted to a little over five lakhs per annum and this sum ought to have been expended yearly on the canals, but since 1867 only 3¾ lakhs could be allotted out of the funds at the disposal of the Bombay Government. Occasionally extra sums have been given, but as often as not, they came

too late to be of use, or from the previous neglect of the canals these additions were still very insufficient.

I have lately urged that five lakhs should be the annual grant in future. This is only just; it is less than what is really taken from the people, still, expressly for this purpose, though no longer shown into account. If it be regularly granted, the cry of deficient canal clearance will soon cease.'

I beg to be excused for reproducing verbatim the three paragraphs from the letter of the Commissioner in Sind. The importance of the subject, however, necessitated this long quotation. It proves three things: first, that the special *hakabo* was levied from zamindars for clearance of canals; secondly, that it was merged into the general assessment for the sake of convenience of recovery; and thirdly, that the amount so levied is not being spent upon clearance but is being diverted to other purposes with the result that there is complaint of deficient clearance.

Colonel Lambert, Collector of Karachi, wrote as follows:—

'Our settlements in Sind are only half settlements. We settle what shall be paid to us for the use of land and water, but we entirely leave our own part of the bargain. I look upon it as utterly useless to expect any settlements to do permanent good, unless, at the time of fixing assessment for the land and water, we also bind ourselves to spend a fixed proportion of the income in supplying the water. In conclusion I would again urge the advisability, nay the absolute necessity, of setting apart at the time of settlements, as one of the conditions of it, a fixed proportion of the income for expenditure on canals.'

I shall now quote from the letter of Colonel Haig, the Settlement Officer, who wrote under his No. 258, dated the 9th August 1873, as follows:

'Turning to the question of the Government management of canals, I quite concur in the opinion that grievous injustice is done under our settlements by the inadequate expenditure on clearing and maintenance. The settlement is made on the supposition that all Government canals will be maintained during the whole term of the lease in thorough efficiency and when this is not done a breach of faith is committed.

The obligation of Government to keep up thorough efficiency is lost sight of, when set against the exigencies of Imperial administration.

No policy could be more short-sighted than that of grasping at every rupee of revenue and stinting outlay on works, which are the essential conditons of obtaining any revenue at all.'

Colonel Haig is very outspoken, and the complaint against Government of breach of faith has become much stronger and louder to-day than it was in 1873. Out of a revenue of thirty lakhs, the *hakabo* amounted to five lakhs or sixteen per cent. on the estimate of Colonel Merewether, and he complained that only 3¼ lakhs were spent on clearance only. That was in 1873. To-day, the land revenue of Sind amounts to more than a crore of rupees and the *hakabo* at the above rate would amount to over sixteen lakhs of rupees. How much does the Government spend out of the sixteen lakhs on clearance? I have not got the figure, but if I put it at three lakhs I do not think I am very much outside the mark. The balance of thirteen lakhs is diverted and swallowed up for other objects and thus misappropriated from the view point of the zamindars. I have got the figures for Guni taluka for twenty-eight years from 1893 to 1920, which I am attaching as an appendix to this letter. It shows that instead of spending sixteen per cent (the old *hakabo*) Government is spending only 3·5 to 4 per cent, on clearance. What is true of Guni taluka, is true of the other talukas of the Province. This growing misap-

plication of the zamindars' money has put most of the canals in a state of through disorder. The clearance is done most imperfectly. The tails are never cleared, and there the silt deposits are six to seven feet deep or more. No water can therefore reach the tails. Instead of clearing the canals, the engineers have begun to set about reducing *karia* heads. This is like treating the eyes, when the seat of the disease is in the stomach. The ocular demonstration held under the orders of the Hon'ble Mr. Cowasji Jehangir should serve as an eye opener to the engineers; they should now transfer their affections from reduction of *karia* heads to thorough and systematic clearance of canals, to raising embankments and otherwise widening the basins so as to bring more water into the canals. They should give no peace to Government until they get more money from Government for clearance; the more the engineers clear the canals, the more satisfactory will their condition be. The late Mr. (afterwards Sir) H. E. M. James who was Commissioner in Sind for a long number of years, bore testimony to the necessity of clearance of canals. He wrote:—

'I need not say that nearly everything depends on canals being properly cleared every year. The Indus water carries with it a much larger amount of silt in solution than any other river known in India. Led off from slowly flowing canals, this silt is deposited in their beds and if not carefully removed every year, the canal becomes choked up. A district with canals in order means a district where there is a certainty of cultivation, and every incentive to extend it, a district where the cultivators must be, if they wish it, happy and prosperous. If the canals are out of order and not looked after, as they ought to be, the reverse will surely be the case.'

In pressing this demand of the zamindars, *viz.*, to spend the *hakabo* or sixteen per cent of the land revenue on canals, to the attention of Government I have to rely upon your support. My association has asked me to seek your good offices in this matter. You are the head of the district you have been in Sind for a sufficiently long time to be in touch with the requirements of the zamindars. You know where the shoe pinches and if you will lend to the complaints of the zamindars your powerful support in the same way as did Colonel Haig and Colonel Merewether in olden days, Government will know that we have a just claim. We want you to strengthen our hands, to get Government to listen to us. Our request to Government, in one word, is to keep to their word of spending sixteen per cent of the revenue upon canal clearance, to earmark that amount in the budget every year and to insist that it should be spent, so as to bring the Sind canals to the highest pitch of efficiency.

This will not only benefit the zamindars whether at the head or tail, but will also increase the revenue of Government. Of late the land revenue from Sind instead of increasing, has been decreasing. Please ponder over the following figures for the whole of Sind.

Average of 5 years ending.	Total area cultivated.	Authorised rice cultivation.
1917-18	5,822,576	1,105,185
1922-23	5,504,640	1,049,660

This table discloses a sad tale. Government is not thriving. Why? because it does not spend sufficient money upon its canals. Government is like an unwise zamindar whose demands upon his income are so great that he does not spend enough money on clearing his water course. The result is that there is not enough water to irrigate

his fields and he is getting poorer and poorer every day. You will thus not only be obliging the zamindars, but will be serving the interests of Government, if you support our demand. My association will owe you a deep debt of gratitude if, before leaving the district, you will get Government to faithfully sanction our funds (levied from us for specified purposes of clearance) for the needs of the canals".

Now it will be seen that clearance of canals has been neglected by the Irrigation Department for the simple reason that they allege that any clearance made is filled up with silt immediately within a month of the canal's flowing and therefore all expenditure incurred is wasted. But I beg to point out that the deeper bed of a canal is required only for the one month of June, when the innundation is lowest because it is indispensable that the sowings of crops like paddy should be started at the earliest in June, and finished at the latest by the end of July before the rains set in to give the best outturn. The deeper bed of a canal is not required when innundation is high in the months of July and August. If a good and early start is given to sowings the success of the crop is assured and if this success is attained all costs on deep clearance are made to the best advantage. The engineer does not realise that timely and early sowings if started well mean all in all to the cultivator. I therefore advocate that thorough clearance of canals, both deep and wide, should be made by the Irrigation Department. But I must admit that deep clearance can be dispensed with when the level of innundation can be artificially raised and kept constant throughout the season of cultivation in the canal length from the months of April, May or June in the same way as is proposed to be done by means of the Lloyd Barrage under construction; and all the annual cost on clearance can be saved to Government. But until this is done all economy on clearance will be at the cost of successful cultivation and the good outturn of crops. If another barrage is constructed below Kotri for Lower Sind, expenditure on clearance could well be diminished; but until this is accomplished it is positively injurious to minimise expenditure on clearance. But before the Kotri barrage comes, it will be of advantage to have many more regulators in big Government canals at short distances to give a constant level of water, and then too deep clearance can be avoided. Within 80 miles of the Fuleli canal there is only one Alipur regulator, whereas there is need for three or four more such regulators. Regulators must precede abandonment of deep clearance. But these regulators should not be used for rotations but for supplying constant levels throughout the season.

Coming now to the question of the distribution of canal water to cultivators, I beg to state that the present methods of distributing waters to the tail ends of the canals is fraught with a great many difficulties. If distribution could be effected in a manner which would not curtail the existing supply enjoyed by cultivators for ages, or if it could be accomplished without cutting off the area of a holding usually cultivated, no zamindar at the head of a canal has cause for complaint; but when on an old pre-British canal like the Fuleli the existing outlets are reduced in dimensions and consequently the usual area under cultivation is diminished and many cultivators' lands thrown out of cultivation, a hue and cry is naturally raised. All measures for reduction of outlets, commencing with open masonry heads and then the Punjab pattern or other patterns, have failed to restrict the water to the extent desired by the Public Works Department. Lastly, the module system of outlets is being introduced with success from the point of view of the engineers; but the zamindars condemn them strongly, as these sluices have successfully served to diminish not only the discharge of their original outlets, but have reduced the level of the waters which the zamindars require for their lands. This process has merely robbed the outlets of the head portions of the canals and transferred water to the tails, *i.e.*, the tail portion of the canal has become the head portion and the head portion the tail. The zamindars at the head look upon this policy as "robbing Peter to pay Paul." The zamindars

prefer wide, deep and open outlets of masonry, for this reason, that with the lowest inundation and the smallest discharge, their supply should be enough to meet the requirements of their cultivation. A rice cultivator is anxious to finish his transplantation before the end of July, as after that the rains set in and make paddy cultivation unprofitable. With reduced heads and reduced levels, cultivation is retarded and prolonged, the chances of good crops are lost to the zamindar and he has good cause for complaint. The zamindar urges therefore that before any modules are introduced in the openings of their water-courses, the Irrigation Officer must secure constant level and constant discharge of the Government canal such as to defy the vagaries of the Indus, by means of regulators in main as well as feeder Government canals like the Fuleli and its branches. Not only this, but they desire that by means of another barrage like the Lloyd Barrage, the non-barrage area also should come under the command of a barrage below Kotri so that the frequent falls of the Indus level may be avoided. Modules have been introduced in hot haste in canals with fluctuating levels and they have failed to make equitable distribution. What the zamindars suggest is that the Irrigation Department should not adopt half-measures which put the cart before the horse. First, constant supply should be secured by barrages and regulators, and then modules introduced, as without constant and assured supply modules are doomed to failure. It is therefore imperative that the Kotri barrage should first be undertaken.

QUESTION 9.—SOILS.—(*a*) (*i*) In my part of the country, *i.e.*, Lower Sind, most of the land is under flow by natural gravitation and is therefore used for paddy cultivation. Continuous annual cultivation of rice has made the soil water logged, especially when it consists of deep *dhoros* (depressions) which lodge water from two to six feet in depth and where water accumulates and remains even for three or four months after the paddy crop is removed. In such tracts all the surrounding higher uncultivated lands which flow irrigation cannot reach have become converted into large areas of *usar* land unfit for the growth of any crop. This condition of water-logging has been the result of want of drainage in the country. There are many irrigation channels cutting across the country which fill all the low lying areas with water but there is no channel to drain away the excess water. The Irrigation Department has never paid any serious attention to providing drainage channels to every tract under cultivation. The result has been that all uncultivated lands above the reach of water have been rendered *kallar* (*usar*) and therefore quite unproductive. The drainage of a country should be held to be as important as its irrigation and the two must go hand in hand. The following are the evils which want of drainage works has caused in Lower Sind:—

(1) All the available uncultivated land adjacent to paddy lands has been made unfit for the growth of any crop.

(2) The soils under cultivation of paddy have become too water-logged and full of noxious weeds that overcrowd the actual crops.

(3) The water in the field becomes stagnant by long accumulation and does not lend that vigour to the crop which fresh silted water can give.

(4) The outturn of the crop per acre is much reduced on this account.

(5) Paddy is subjected to various crop diseases under the condition of excessive moisture.

(6) The whole country under flood produces malaria of the worst type which is dangerous both to human beings and the cattle

that live in the locality. Malarial fever attacks all the inhabitants of the village, and the cultivator with all his family lies low in his hut, fever-stricken for days together, while his paddy crop is shedding grain on the ground because there is nobody to reap the over-ripe field.

(7) If there is any accidental breach in a canal or a heavy shower of rain, the cultivated land gets overflooded, the paddy crop overtopped by water, and there is no way to drain this water away to save the crop. Thus, immense loss of crop occurs to hundreds and thousands of acres by the lodgment of water. The rains of 1927 in Lower Sind have wrought havoc in the country, destroying crops and cattle of the value of several lakhs of rupees. Because there was no drainage, continuous rainfall for five or six days with a fall of fifteen to twenty-five inches made a swamp of the whole country, water rushing into the dwelling-houses of the people at midnight. The mud houses crashed, the belongings of the people were washed away. They made rafts of their cots and saved their own lives and the lives of their womenfolk and children with great hardship, suffering numerous privations, being without food, clothing or shelter. The crops were of course ruined by the lodgment of water for several days after the rains. Even the fall of eight inches or so of rain in 1926 caused great damage to crops and low lying villages.

It is essential that the Public Works Department should realise the gravity of this situation and made a bold effort to provide effective drainage channels for all the fields and villages. If Government is beset with difficulty regarding finance for drainage works, I am sure all cultivators will be glad to contribute an additional revenue of four annas per acre for every acre of land under cultivation which can be provided with proper drainage. The proceeds of this cess may be ear-marked for drainage works and utilised to cover the interest charges of the capital invested in drainage works. The Public Works Department should undertake this work at once and save the people from disaster which occurs almost every year to a small or large extent.

(*ii*) Much alkali land is lying waste in Lower Sind which could easily be improved and rendered cultivable if abundant canal silted water were to flow on to it, and the soil were brought under rice cultivation. In the first two years of its cultivation it gives meagre crops, but from the third year the salts disappear and normal crops of paddy can be reaped from it. Most of the alkali or *kallar* lands, as they are called in Sind, are above the level of flow water, but wherever by means of regulators the level of water has been raised to them for flow, they have successfully been made cultivable. If the new barrage below Kotri is built it could provide a higher level of water in the river, canals and streams and a very large area under *kallar* could then be reclaimed, with great advantage to the State. Similarly other uncultivable lands now lying waste, whether half sandy or half *kallar*, could be brought under rice cultivation as well, and thus improved in texture because the silt of the Indus has renovating power, and rice can adapt itself to any texture of the soil. Rice though a favourite with the Sind cultivator is not looked upon with favour by the Irrigation Department for the reason that it consumes nearly twice as much water as the dry crops, *bajri* and *juar*, though it pays nearly twice the assessment of dry crops. It has earned this disfavour from the engineers and revenue officers for this reason also, that it causes malaria in the tracts where it is grown. But my experience as a cultivator of thirty-three years standing (under the existing conditions of water supply) gives the first place to it in point

of net profit, on account of the ease with which it is planted and comparatively smaller expenditure its cultivation requires. I think the prejudice with which it is looked upon by the authorities is undeserved, and the restriction upon its further cultivation which the authorities have imposed is uncalled for and detrimental to the real interests of the cultivator. The advantages which rice cultivation afford may be enumerated below.

Rice can be cultivated for twenty to thirty years successively, every year, on the same soil after the soil is newly broken under the plough, without incurring any cost of manuring. It gives as net profit more than any other cereal crop. If the soil is old and has been cropped many years successively, then it is left fallow during one *kharif* and sown with *rabi* the same year, rice being repeated next *kharif* with a nice yield. In fact it renovates its vitality at once and the silted water of the Indus is sufficient to maintain its vigour from year to year. Other dry crops like *bajri*, *juar*, cotton and tobacco cannot be cultivated on the same land repeatedly from year to year without manuring, which process costs about ten rupees to twenty rupees an acre if the soil is manured with farmyard manure. This, however, is so scarce that it cannot be applied to extensive areas of annual cultivation, so that practically, where a zamindar or *hari* cannot invest much money on manure and where manure is scarce or unavailable, it is natural that the cultivator should show his preferences for rice cultivation. In fact it is essentially a crop for a poor man with little capital, the only thing needed for its successful growth being a plentiful supply of uninterrupted water throughout the season. The only thing that decreases its yield is want of drainage of the soil. If at intervals the soil could be drained of its stagnant supply, and then again refilled with fresh silted water from the canal, it could double its produce. But at present Government policy has been to starve it out, and to discourage its further extension. This is a mistaken policy. Instead of building drainage works to drain off excess water and thus avoid malarial conditions in the locality, they have discarded the crop, which has found so much favour with the ryot. Again, rice is grown in low-lying marsh, ditches and depressions, in which no other crop can be grown. Rice, being an aquatic plant, can stand much water, whereas other crops will wither and die if water is lodged long at their roots. Further, under favourable conditions, the same rice soil, after the rice is harvested, can be ploughed on the same moisture and sown with winter pulse crops in the same year, yielding additional profit, besides providing valuable green fodder for cattle in winter when such fodder is scarce throughout the country. Such second pulse crops are universally grown in Upper Sind, renovating the soil with nitrogen from the air through the nodules in their rootlets. But in Lower Sind, on account of want of drainage, the soil cannot get dry enough in time to be sown with a pulse crop and hence the soil is denied the advantages of enrichment by, the growth of pulse crops after one, two or three years' cultivation has made it necessary. Given a plentiful supply of water and efficient drainage in Lower Sind, rice soils could produce bumper rice crops and rich second crops of pulses as well, with all the benefit of green fodder for winter from year to year.

(*b*) (*ii*) In my experience as zamindar, I have observed that my lands, (in *dehs* Moya and Sethiari-Guni, district Hyderabad) were mostly lift lands from the year 1894 to 1905, cultivated under *bajri*, as the water supply was scanty and unreliable, and the net revenue to Government out of cultivation varied from Rs. 600 to Rs. 1,000 at the most. All the lift land was pure rich clay-loam perfectly sweet, with only a few patches of alkali *kallar* soil. Sweet water could be had in wells at a depth of 30 feet from the sub-soil sandy layer. In the year 1906 Government cut a new canal called the Karyowah, the supply of water on that account improved, and lift lands could be commanded by flow water. Lands situated in the *dhoros*, *i.e.*, depressions, which were formerly cultivated under rice with partial success, got a more steady supply of water and bore better rice crops. Some of the former lift lands, now commanded by flow water

also, were brought under rice cultivation. After a few years' cultivation under rice, the area under rice cultivation expanded and the same *dehs* which yielded a revenue not exceeding Rs. 1,000 began to yield a revenue of Rs. 4,000 a year. But unfortunately, during the rains the lands used to be overflooded from the Government extensive waste lands lying to the north, the crops being entirely destroyed with immense loss to the cultivators, and gradually they became water-logged. The cultivated land being surrounded by high land all round, there was no way to drain out the excess water which lodged for several months. Some sweet lands that were above the reach of flow water and were cultivated under lift crops, became *kallar* infected, and are now quite uncultivable. Alkali salts were deposited on the top in a thick layer of about a foot deep. This can only be cultivated under rice if the water in the Government canal attains a higher level by means of regulators in the Fuleli or a barrage over the Indus at Kotri. Rice is the only crop that can improve such lands. With regard to the sub-soil water, it is now found that its level has risen by about twenty feet so that a well dug now gives water at a depth of ten to twelve feet instead of thirty feet as before. All the surrounding lands, formerly sweet and above the reach of flow water, have turned *kallar*. This marked deterioration in the soil has come about within my own observation within the last twenty years.

(*c*) The measures which Government should take to reclaim areas which have gone out of cultivation on account of *kallar* are:—

1. Raising of water level in Government canals by means of regulators to command such lands with flow water.

2. To allow rice to be grown in such lands, as silted water from the canals is bound to neutralise the salts in the soil and render the soil cultivable.

3. To provide drainage channels in every tract to carry the salts away from the soil and render it sweet.

QUESTION 16.—ANIMAL HUSBANDRY.—(*a*) (*i*) For the improvement of breeds of livestock I would suggest that Government supply bulls of the best breed free of cost to zamindars who take interest in breeding, so that the existing breeds may improve and supply strong plough or draught cattle.

(*ii*) Betterment of dairying industry:—Qualified men in agriculture and dairying may be encouraged to open private dairies by means of subsidies, grant of pasture lands for dairy milch cattle and other necessary facilities.

(*b*) (*i*) and (*ii*) *Over-stocking of common pastures and absence of enclosed pastures.*—Sind being a rainless country and having canals which afford irrigation for three or four months in the year, pasture is very scarce. For nearly six months in the year all the cattle have to live on dry fodder which is not available in sufficient quantities and does not provide nourishment either for the plough or the milch cattle. Besides that, even in the season when canal water is available, there is hardly any pasture land in the village, much less necessary water supply for the irrigation of pastures, as the greed of zamindars has utilised for cultivation all the available land and the cattle have to roam about in a semi-starving condition. I would suggest that every village should compulsorily be supplied with twenty to fifty acres of pasture land for the free grazing of the village cattle, and the Irrigation Department should supply water for this area free of charge. If suitable Government land is not available for this purpose near the village site, land should even be acquired and reserved for pastures. Further, zamindars may be encouraged to maintain pasture lands by remission of the present assessment. But construction of the barrage below Kotri by supplying perennial water would remedy this want.

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(*c*) The months in which the cattle experience shortage of fodder most are the months of May and June when the dry stored fodder has been consumed and the green fodder has not yet sprung up. It is from the month of August, and after the rains, that green fodder is made available, when the condition of the cattle improves somewhat. But in rice growing tracts it is not possible to keep the cattle for a long while after transplantation when the tract becomes infested with mosquitoes on account of the water-logged condition of the soil. Most of the cattle migrate to high lands where, too, if there is no abundant rainfall, the green fodder is scarce and the cattle are famished.

QUESTION 17.—AGRICULTURAL INDUSTRIES.—(*e*) Yes, there is much scope for work by Government; for instance, in Lower Sind where the staple crop is rice and rice straw is to be had in abundance, and is simply thrown away and burnt, some machinery for manufacturing paper from rice straw should be a very useful supplementary industry for providing employment for the poor peasantry.

QUESTION 24.—ATTRACTING CAPITAL.—(*a*) The necessary steps to induce a larger number of men of capital and enterprise to take to agriculture are:—

1. To throw open, to men of capital or to registered agricultural companies with capital in hand, formed with the object of carrying on agriculture, large areas of Government waste land with facilities from the Irrigation Department to cut new canals for the cultivation of such tracts, because Government cannot cope with so much expenditure and capital required for such a vast area still lying uncultivated. Waste lands should be given to such companies on nominal value or full value to be recovered gradually in ten or twenty instalments.

2. To grant all facilities to such individuals or companies in the matter of acquiring lands for the passage of canals or embankments if these are necessary.

At present men of capital and enterprise are literally kept out of the domain of agriculture by Government and no encouragement is forthcoming. The original occupants or their descendants have been granted special privileges and these men stick to their ancestral traditions and have no ambition for any improvements on the old system of cultivation. These men are very conservative and worshippers of the past only. They are in fact only parasites. The present policy of Government is retrograde and it should be entirely changed to improve agriculture.

Men of education and experience in agriculture, if interpersed in all talukas, will serve as an object lesson to all the uneducated mass of zamindars, and I am strongly of opinion that reform in agricultural practices can come only by ocular demonstrations, which such men of enterprise and capital will provide.

(*b*) The factors tending to discourage owners of agricultural land from carrying out improvements are:—

(*a*) want of education, (*b*) ignorance of the existence of any better methods on account of their narrow outlook, (*c*) conservative habits, (*d*) want of enterprise, (*e*) deep-rooted belief that no

effort will avail them except what God has destined for them, (*f*) want of capital which they cannot raise even for their barest wants without heavy interest, and (*g*) patronising policy towards the so-called hereditary class of cultivators.

APPENDIX (*vide* para. 12).

Statement, submitted by witness, showing collection of revenue, cost of clearance and percentage of the latter to the former, in the year 1871-72 and from 1893-94 to 1921-22.

IN TALUKA GUNI.

Year. 1	Collection of land revenue. 2	Cost of clearance. 3	Percentage of Col. 3 to Col. 2. 4
	Rs.	Rs.	
1871-72	...	21,534	...
1893-94	1,55,178	27,059	17
1894-95	1,65,136	21,744	13
1895-96	1,52,325	31,662	20
1896-97	1,83,106	26,760	14
1897-98	1,94,453	23,828	12
1898-99	1,69,629	22,505	13
1899-1900	1,54,591	29,708	19
1900-01	2,00,399	30,163	15
1901-02	1,48,762	23,310	15
1902-03	1,02,319	36,421	35
1903-04	1,66,891	19,204	11
1904-05	1,43,345	33,991	23
1905-06	2,11,184	47,304	22
1906-07	1,95,630	21,247	10
1907-08	1,48,941	Not available.	...
1908-09	1,76,918	Do.	...
1909-10	1,91,593	16,538	8
1910-11	1,90,204	19,030	10
1911-12	2,22,305	14,794	6
1912-13	2,44,050	19,050	8
1913-14	2,19,993	17,457	8
1914-15	2,87,453	17,457	6
1915-16	3,22,763	18,628	6
1916-17	3,50,093	12,664	4
1917-18	3,15,414	12,465	4
1918-19	2,46,705	14,499	6
1919-20	2,99,137	10,234	3·5
1920-21	2,85,117	10,603	4
1921-22	2,86,761	...	...

Rao Sahib Udharam Shewakram.

Oral Evidence.

60729. *The Chairman:* Rao Sahib Udharam Shewakram, you are of the district of Hyderabad?—Yes.

60730. What has been your occupation?—My occupation is agriculture; I am a zamindar agriculturist cultivating my own lands.

60731. Cultivating yourself?—I myself through my *haris;* I give personal attention.

60732. Have you any home farms at all?—No.

60733. You are anxious, I see, that the agricultural research organisation should pay more attention to food crops which are consumed in India?—Yes, to indigenous crops.

60734. That is, *bajri* and *juari.* Has the department succeeded in introducing any agricultural improvements which have been successful in your own neighbourhood?—None that I know of.

60735. I see that on page 221 you suggest that the value to the parents of the boy's services in various directions makes them disinclined to send him to school?—That is true.

60736. You suggest that arrangements should be made to allow the boy to work on the farm and go to school as well?—Yes.

60737. What sort of a day's work is a boy of seven expected to do?—He is sent to graze the cattle.

60738. At what time does he start out in the morning?—Early in the morning, at seven or eight.

60739. At what time does he get back?—At eleven or twelve.

60740. Does he again go out?—He again goes out at four or five.

60741. When do you suggest that he should go to school?—I have suggested that he should attend the school from two to five. Then again he would go to the fields and return, and after that attend the school at night.

Rao Sahib, you were no doubt a very industrious boy, but do you think that, if you had been out in the morning to attend to the cattle and had returned at noon, and then sat down in a somewhat stuffy school room and had had levelled at your head some of those extremely dull lessons from which we have all of us suffered, you would have remained awake? I, at least, could not have done so.

60742. Would you attach any importance to the improvement of communications in Sind?—I attach great importance to it. In fact it is a very important factor in the growth of trade and commerce; there should be communications between rural areas and urban areas.

60743. In your answer to Question 8, you attach great importance to silt clearance?—Yes.

60744. I suppose there is a limit to the advantage of silt clearance. Is it any good going deeper and deeper below the gradient?—What I say is that clearance should be made at a point where the lowest inundation can reach it. We have to safeguard the crops and enable them to mature; for this, water is required at a particular time and should be stopped at a particular time. If the canal is dug deep, even in low inundation we can get enough water to start cultivation. If the bed of the canal is high, then the canal will not flow and we cannot get any water to cultivate. It must be borne in mind that the duration of the inundation is short and we have to ripen our crops within that time: unless we start quite early there is a danger that inundation may end early and our crops may not mature. We have to clear our own *karias* also; we clear so as to catch the lowest inundation; we take this prudent measure for meeting the vagaries of our river. When we have spent three to four thousand rupees on our clearance, we have a right to expect Government to clear their own canals in sufficient depth to give us water.

60745. After all, it is no use clearing a little here and there, regardless of the gradient: water cannot run uphill?—Every canal has low and high lands. There are some lands which will not be reached even in the highest floods, but there are other lands which are reached by the lowest inundation.

60746. I observe that in answer to Question 9 you suspect that the Irrigation Department is viewing with disfavour any cultivation of rice although, according to you, rice pays twice the assessment that *bajri* pays, the water charge being twice as much. What makes you think that the Irrigation Department does not like rice?—There is the Commissioner's circular which places a general restriction on the cultivation of rice. For instance, adjacent to my own lands there are lands suitable for rice, but they would not be granted at all.

60747. But the Commissioner has no natural prejudice against rice; why has he imposed this restriction?—He has imposed it because he thinks it takes more water and makes the climate more damp and more unhealthy. But we feel that with regard to certain lands we have no choice but to cultivate rice; rice will grow there better than any other crop; the very first rain will swamp any other crop; only rice can resist the onslaughts of water.

60748. On page 223 you express great concern about the effect, in certain districts of Lower Sind, which may result from the building of the Barrage. Are you competent to give an opinion in this matter?—My experience tells me that if water is held up at Sukkur by three, four or five feet, it is certain that the level at Kotri will fall by two or three feet. Every man can understand that.

60749. Do you wish to controvert any particular statement made by or on behalf of Government as to the effect which the building of the Barrage will have on the agricultural interests of Lower Sind?—Mr. Shoubridge did make a statement that the water at Kotri is sure to fall by one or two feet.

60750. Do you agree with that?—I do.

60751. Do you wish to disagree with any statement? Do you challenge any of the statements that have been made?—Yes; Mr. Shoubridge said that Lower Sind would not suffer very much by the fall in the water level; I do not agree with him there.

60752. On what do you base your views?—I base my views on the common understanding that if water is held up at any particular place by about five or six feet, it is bound to lower the level at a place situated below it. Even now when the Lloyd Barrage does not exist and water is freely admitted, we experience shortage of water level at Kotri; if water is held up by the Barrage, we shall experience greater shortage.

60753. From your own knowledge of the Province, do you think that the dangers which you foresee to Lower Sind are such as to lead you to wish that the Barrage had not been constructed? I ask you Yes or No?—We never wish that there should be no barrage, but we want a new barrage below Kotri.

60754. So, you do not quarrel with the policy?—No. Barrages are essential for the success of cultivation in Sind.

60755. Do you, as a practical man, think it is possible to construct more than one barrage at a time?—But then, efforts ought to be made to provide against hardships ahead rather than wait until we are ruined and then construct. That will be a bad policy. Here we have been carrying on our cultivation all right, but if the flow water is stopped we will suffer greatly. We feel that there will be ruin to our lands.

60756. To go into a matter of detail, you do not like the module system; is that so?—We do not, because in practical working every zamindar is complaining that the introduction of modules has shortened his supplies.

60757. The tail portion of the canal is becoming the head portion and the head portion the tail?—That has been the result.

60758. That is in terms of receiving water. It is now an advantage to live at the tail?—Yes.

60759. Where do you live?—I live both at the head and the tail.

60760. You have seen a great deal of deterioration consequent upon irrigation and waterlogging?—That is because there is no proper drainage. I attribute all that waterlogging to want of drainage; in fact drainage has been practically neglected.

60761. On the one hand you want drainage; on the other hand you want the land to be charged with silt?—Drainage is the natural cure for water-logging.

60762. Do the inundation canals lay down a rich deposit of silt on your lands?—Yes; they do in regard to flow lands.

60763. Any in lift areas?—Not in lift areas, because in lift areas the silt settles down in the canal, and when water is raised it does not bring much silt to the soil. In flow land the silt flows with the water and is deposited.

60764. Have you had any experience of reclaiming land that has been infected with *kallar*?—Yes; if there is silted flow water, after two or three years' cultivation with rice the *kallar* land becomes quite sweet. High lands cannot be reclaimed.

60765. Do you think red rice is more effective in improving *kallars*?—Yes.

60766. *The Raja of Parlakimedi:* You complain of the bad state of the roads?—Yes.

60767. May I know what allotment is made per mile?—About ten rupees a mile is the allotment we receive from the taluka board. I think five thousand rupees is spent upon roads which have a length of about two hundred miles. The repairs are inadequate.

60768. Has there been any difference in the allotment within the last few years?—No difference at all.

60769. To what extent should the allotment be increased in order to keep the roads in efficient repair?—You mean the Government allotment?

60770. I mean the total amount?—It should be quadrupled before we can do anything. If that is done, we can take up blocks of forty to fifty miles every year and improve them by turns.

60771. As communications are very necessary for special agricultural districts, should not the local bodies economise under some other heads to meet this charge?—I am afraid there is no head from which we can take any amount. There is very little available with the district local board itself; there is a great length of roads under its control, and what is provided for other purposes is hardly enough for those purposes.

60772. Can you not levy a cess for improvements?—I am afraid not; our levy has already been increased from four pice to five pice in the rupee of assessment.

60773. That is not very much?—Not very much, but I am afraid the profits from agriculture are not such as will permit the agriculturist to part with more money; already the agriculturist is crying that there is little profit from agriculture, and therefore he would not pay more.

60774. Under village sanitation and education how much is allotted? Which takes most of the revenue?—Education takes most; that is what I believe.

60775. What arrangements have local bodies made for the maintenance of village sanitation?—The only step that the local board takes in the case of sanitation is to grant a contribution to the village sanitary boards; there are not many boards, only six or seven in a taluka. A sanitary board is formed in each village when the panchayat of the village contributes about half the amount; the other half is contributed by the local board and the Government; five by the panchayat, four by the taluka board and three by Government.

60776. Does your village receive any grants for improvement of drinking water supply?—None whatever.

60777. Have you applied?—No.

60778. How many schools has your village?—My village has got one school.

60779. How many schools does the taluka board maintain?—It has got about sixty or seventy schools in the whole of the taluka.

60780. Up to what standard?—Up to the fourth standard; that is, the fourth vernacular.

60781. Is any attempt being made to give preliminary agricultural instruction?—None whatever; in fact the teachers themselves do not know anything of agriculture.

60782. Would you like to have some instruction of that kind given?—I would, very much. From the very start the boys who are agriculturists should get some teaching in the principles of agriculture in their school, so that it may serve them in after life in improving agriculture. There must be some text book on agriculture.

60783. Are you making any attempt towards it yourself?—No; I have not made any attempt.

60784. You complain about postal arrangements in villages. In what way would you meet the difficulty?—Every big village ought to be served with a free postal dlivery, if not once a day at least once in two days.

60785. *Professor Gangulee:* What do you mean by free postal delivery?—I do not mean that there should not be the usual payment of stamps, but that no additional levy should be made.

60786. Under such deliveries, do you include the money order system also?—Yes; the delivery should be made on the ordinary terms. The delivery should be made in the village itself; there should be some postal official to deliver as well as receive letters and money orders.

60787. Is not the real reason for this state of affairs the dearth of proper and reliable persons to take up such work?—In every village you can get the headmaster of the school to do that work very nicely at a small charge.

60788. The headmaster of which school?—The headmaster of the local fund school; he can take charge of that work.

60789. Do you think people will be available to stand security for him?—Yes; I think so. At any rate I could supply one. I have several times made the request that a post office should be established in my village, which contains seven or eight hundred souls, and every time that request has been rejected; though I undertook to make good any deficit, they would not open one.

60790. Did you undertake to make good any leakage that there might be?—Which leakage?

60791. The postman might run away with the money orders; that is rather common?—I meant any deficiency in the expenditure that will be incurred in employing a postman for delivery.

60792. *Mr. Jamshed Mehta:* How many letters do the people in a rural village send or receive on an average per day?—When I got tired of requesting the authorities, three or four of us, zamindars, combined and appointed a man to send and take delivery of our letters. We received six or seven a day.

60793. That is about the zamindars; what about the other people? How many letters do they send in the course of a day?—They are receiving, after this convenience has been given, about fifteen or twenty a month.

60794. For the whole village?—Yes.

60795. I am not quite clear about this suggested free postal delivery in the rural villages. Are there any charges made beyond the ordinary postage charges?—Sometimes the peons who come and deliver the letters exact two or three pies for each letter they deliver.

60796. *The Chairman:* Is that a recognised and sanctioned charge?—No, it is not.

60797. That is an impost?—Yes.

60798. *Sir James MacKenna:* And do you zamindars give it?—Some do and some do not.

60799. *Professor Gangulee:* What happens if you do not?—Then you will find that your letters are stolen.

60800. *Sir James MacKenna:* On page 221, you say the impression is abroad that Government devote more attention to cotton and wheat crops that are exported abroad than to crops that are consumed in India?—Yes, it is the general impression.

60801. Is it not the case that the crops which are most extensively exported are also the crops which are most extensively consumed in the country?—No. For instance, I have in view the crops of *bajri*, rice and *juari*. Those are the crops which are not exported but they are the crops which are most extensively consumed and locally used.

60802. *The Raja of Parlakimedi:* But is not the country made prosperous by the export of those crops?—Certainly, it is; but at the same time I said that attention should be paid to both; I do not mean that the export crops should be neglected, but I say equal attention might be paid to both.

60803. *Sir James MacKenna:* What about the favourable conditions that prevail in Spain and Italy?—I read some reports that paddy there gives about thirty or forty *maunds* per acre. Now, enquiries might be made as to what are the conditions which lead to the production of such crops, whereas we cannot get more than nine or twelve *maunds*.

60804. It is comparing the salubrious climate of Italy with the inferno of Sind?—No, I said enquiry might be made as to how our conditions here might be improved.

60805. Yes, you are quite right?—It is worth enquiring into.

60806. *Professor Gangulee:* Have you interested yourself in the taluka development associations?—No, I have not.

60807. Do you know anything about this organisation?—Yes, I have heard of it.

60808. You are familiar with the working of the organisation?—No.

60809. Would you like to see it started in each taluka?—Yes, I would like to see it, certainly.

60810. Would you make a move in that direction?—I have not yet made any.

60811. Do you find any appreciable decrease in the yield of crops in Sind?—Yes, I have been feeling that there is a decrease.

60812. Of rice?—Of rice; I have much experience of rice cultivation.

60813. Do you find the rice yield is decreasing?—Yes, because the soil is deteriorating on account of there not being any drainage at all. I find that lands that are not provided with drainage cannot give us good crops.

60814. On the question of drainage, you suggest that your zamindars would be prepared to pay a cess of four annas per acre?—Yes, if the amount is earmarked for that purpose.

60815. Do you make that suggestion yourself, or have you consulted other zamindars?—I have consulted some friends who also agree that they will be prepared to pay four annas more if effective drainage could be constructed for the drainage of excess water from their areas.

60816. Have you approached the Government with that offer?—No, we have never approached them.

60817. You make another proposal of an additional cess of one anna in the rupee for compulsory education; is that right?—Yes.

60818. Do you think the zamindars would be prepared to accept that proposal?—I do not know whether they would be prepared or not; that is my proposal.

60819. That is your view?—Yes, it is my view that for the encouragement of education that should be done. We cannot get it without sacrifice.

60820. In answering a question of one of my colleagues, you said something about the water supply for drinking purposes. It is not clear in my mind what is the actual position?—I feel that in the rural areas water for drinking is very defective. In fact, when the canals are dry, and the canals remain dry for about seven or eight months in the year, then our source of supply for drinking purposes is by means of wells. In some places wells give us very brackish water, and in other places you cannot tap a good well. During the whole of that season of seven or eight months good water cannot be had for drinking purposes. In fact, that is one of the reasons why people in urban areas do not care to go and live in rural areas. In certain places good

drinking water cannot be had. When the canals flow, which is only for a period of four or five months, we get good drinking water.

60821. Do you think that during those seven or eight months wells can supply drinking water?—We dig wells; we have to live upon wells. Whether it is brackish water or not, we have to drink it.

60822. Have you sunk wells for your *haris*?—I have sunk seven or eight wells.

60823. On page 232, you say that at present men of capital and enterprise are literally kept out of the domain of agriculture by Government, and no encouragement is forthcoming?—Yes, I find the policy in Sind has always been to encourage the hereditary owners and any new-comer is literally kept out of agriculture. If there is a man of capital who goes and applies for land, Government will either make too heavy a charge or will not allow him land because it always adjoins some neighbouring zamindar's land.

60824. Again, I am not clear what you really mean when you say no encouragement is forthcoming. What encouragement do you expect from the Government?—Supposing there are some educated men who want to pursue agriculture, then they will apply for certain Government waste land somewhere. If that land could be obtained on easy terms with facilities for irrigation, many people would go in for it; but I am sure, if they make such application, it will not be entertained.

60825. Do you know of any application that has been refused on that account?—I cannot give you particular instances but the general policy is known, and therefore nobody ever applies for it.

60826. *Mr. Calvert:* Has any educated man ever applied to you for land as your tenant, as your *hari*?—As my *hari*, no; I do not think that would suit him.

60827. *Professor Gangulee:* Further on, you say they are in fact only parasites. To whom are you referring?—Some of the old zamindars.

60828. The new ones are not parasites but the old ones are?—Yes, the old ones are.

60829. *Mr. Kamat:* I should like to ask you a question or two as to the public attitude in this Province to the road policy. You said just now you were in favour of levying a one-anna cess for compulsory primary education. Similarly, as a good citizen, would you not be in favour of some additional cess for roads?—I am afraid there will be an accumulation of such cesses which will be too much for the zamindars to pay.

60830. Such a cess would be too much?—Yes.

60831. Have you worked it out as a matter of profit and loss, if that were done? I mean, by comparing the present cost of transport on one side and the additional profits if the roads were improved on the other?—No, I do not think there will be any profit in that direction.

60832. At any rate, you know there is a bright future for Sind when this Barrage comes and a lot of additional produce either in the shape of cotton or other material is brought on the market; you can foresee that easily I suppose?—Yes.

60833. But unless this policy of giving good water from the Barrage is coupled with a policy of giving good roads, you may not get the maximum price for your additional produce?—Yes, that is quite possible.

60834. Cannot you see that improved methods of transport will give you bigger profits than when transport is by the camel cart going at a crawling pace. If it is a small cess compared with the increased profit, why should the public be against it?—If the roads are repaired I do not think it will make much difference in the methods of transport. If you bring in a railway or some feeder lines to carry produce, the rates will become lower and that will make a difference; but if there is no feeder line, and the roads are merely repaired and we have to resort to the same camel or cart traffic, I do not think it will make much difference.

60835. We will leave aside the question of feeder lines because feeder lines cannot touch every village; we are talking of the smaller roads. Would you

be in favour of simply repairing the roads and perpetuating the camel traffic? Is that what you mean? You do not want motor traffic?—We do want motor traffic.

60836. You do not want better roads?—Certainly we do.

60837. If that is the case, do you imagine you can scrape up the necessary money merely from your sanitation expenditure or from any other minor expenditure in the budget?—No, I think our budget is too meagre and small.

60838. I suppose the people's representatives, both on your district local boards and your Legislative Council, scrutinise the budgets very carefully but find they cannot scope out the requisite additional funds for roads from any other head of revenue?—I believe not.

60839. If that is the case, why would not you favour a small cess, if that will save you a lot of transport costs, especially as you are going to have this Barrage and there are signs of plenty before you?—I personally am not going to benefit by the Barrage; on the contrary, I am going to suffer by it, so that I would not like to tax myself any more on account of the Barrage.

60840. But looking at the whole as a good citizen, would you not favour a small cess for road purposes, just as you are favouring this compulsory cess for education?—I would, certainly.

60841. *Mr. Jamshed Mehta:* You are a zamindar chiefly and in fact almost wholly interested in rice cultivation?—Yes, because of the nature of my land.

60842. With regard to the roads, do you think, if roads are built by the Government, there will be a good deal of motor lorry and motor car traffic?—There is bound to be.

60843. Then you would expect the Government customs revenue to be considerably increased: the zamindars would go in for motor cars. Would that constitute a source of revenue to Government?—Yes, it would.

60844. Would you recommend that, out of such increased revenue from motor lorries, the Central Government should give a part to the Provincial Government?—Yes, I think some contribution ought to be made by Government.

60845. Do you think, if compulsory education were applied to the village as it is now, agriculture would suffer. You speak of certain hours as not being practical from the point of view of health or education. Then what would you suggest? Would you suggest that the boys should not be given education, or that agricultural education should be given?—I should certainly suggest that education should be imparted to them. If the other suggestions I have made are not practicable, then of course the present morning and evening hours may be fixed.

60846. You make a suggestion on page 222 with regard to a mortgage bank. There is some fear in the minds of some people that if the zamindars are relieved of their debts they will incur fresh debts, and therefore it is no use helping them. What is your view? Supposing the zamindars are relieved of their debts by having long-term redemption loans, do you think they would incur debts again by spending the money lavishly in some other ways?—I do not think there is any truth in the suggestion that the zamindars spend lavishly. The fact is that their incomes are small. It is only in a few exceptional cases that there may be luxurious expenditure; generally speaking, I think they are the most parsimonious people living.

60847. What is the charge of the zamindar to the *hari*?—The zamindars' charges range from twelve to twenty-five per cent. As a matter of fact, as bad seasons occur frequently all advances cannot be recovered every year and generally the zamindar is forced to take the cattle or some other property of the *hari*, which does not pay half the debt.

60848 On page 223, you refer to the Gaja system. Will you explain what that means?—In Guni taluka there is the Gaja Canal which irrigates a good portion of the taluka. There is a proposal before the Government to dig a new canal called the Mehrani Canal which takes off direct from the river; that proposal is now before Government for sanction. My

suggestion here is that that project should be sanctioned early so that the cultivation may extend and benefit by the new supply of water.

60849. You make very strong mention, in your statements, of certain agreements which have been made by the Government in the past with regard to the levying of *huccaba*?—Yes.

60850. You feel that that agreement was not carried out and you also use the word "misappropriation"?—Yes.

60851. Is that the general opinion of the zamindars of your district?—Yes.

60852. You think the Government ought to carry out the contract by clearing the silt?—Yes; I will explain what it means, though I think I have given the explanation already in my answers. Formerly, in Sind, the cost of clearance of canals was considered to be a most important charge; without clearance of canals we cannot get water to the lands we cultivate.

60853. That was so formerly, but is that the opinion of the zamindars at present?—At present everybody is very strong on the point that clearance charges are a first item, and without clearance of canals we cannot advance cultivation. In fact what I say is that, from the extracts from Government records, formerly there was statute labour by which people used to supply labour for clearance. Then, after the conquest Government abolished that forced labour, and instead of that labour they imposed a kind of cess, specially for clearance. Then they merged that cess into the assessment, because the names of more cesses would only frighten the people; that is now being levied. Government used to spend about sixteen per cent. of the assessment upon clearance of canals. Now we find only three or four per cent. is being spent on clearance of canals.

60854. And that is what you call misappropriation?—When a special cess is levied for the purpose of clearance and it is not now spent for that purpose, certainly we say it is misappropriation.

60855. *Mr. Kamat:* Have you seen the actual wording in the Government records and seen whether the undertaking was for silt clearance or for maintenance of the canals as a whole?—It is maintenance of canals, which includes silt clearance.

60856. But all the while you are arguing that the whole of that percentage should be spent on clearance only. That is what Sir Chunilal Mehta pointed out?—Maintenance of canals here in Sind means clearance; clearance is the first charge upon the cost of maintenance.

60857. Maintenance may mean any amount of repairs and other charges?—No, repairs should not mean constructing bungalows, roads and gardens; all the cost is absorbed in those items, whereas the real item of clearing canals has very little spent upon it.

60858. *Mr. Jamshed Mehta:* You are very strongly against modules and you speak of robbing Peter to pay Paul. Modules are supposed to give equal water to the head and to the tail; how do you think it is robbing anybody? You are at both the head and tail, but, apart from that, what do you mean when you say it robs somebody to pay somebody else? We want to understand the situation?—The introduction of modules has resulted in taking off water from the head zamindars and transferring it to the tail zamindars. Formerly, without modules, there is no doubt that the tail zamindars used to get less water than the head zamindars, but by the introduction of modules the position has been reversed; that is to say, the modules are so narrow and designed in such a way that the water that the head zamindars used to get has been transferred from them to the tail portions.

60859. Does not the tail get more?—The tail people are getting more water than the head people.

60860. I can understand that the tail people are getting more water than they got before; but that would mean that some difficulties were removed from which they were suffering before?—But it is at the expense of the head people. Supposing the headman has been made to curtail his cultivation by a hundred acres, no doubt that water has been sent down to the tail, but the head people have suffered.

60861. Would you be in favour of the introduction of modules if an equal distribution system were adopted?—In the first place, I want to place this before the Commission: that equal treatment is not contemplated even according to the terms of the settlements. We have, in Sind, irrigational settlements; that is to say, the assessment is not charged equally to all but according to the extent of the convenience the irrigation supplies. For instance, those that are at the head portion are generally charged four rupees per acre for the same crop for which those at the tail are charged three rupees or two rupees eight annas per acre. When the settlement has differentiated in the rates of settlement between those at the head and thoe at the tail, there should be no equality of treatment in the distribution of water. Of course, if the settlement were changed and those at the head and those at the tail were charged the same rate of assessment, you might fairly say: "We will distribute water equally to all." The Revenue Officer comes and fixes the settlement rates unequaly according to the convenience of the supply of water; that settlement has been guaranteed to run for about ten or twenty years; but before that period expires there comes the Irrigation Officer who says: "I am going to put a module in your *karia* head and diminish your supply and give it to tail zamindar." This is quite unfair.

60862. *The Chairman:* Is there no adjustment from year to year in the assessment?—No, the assessment is fixed for ten or twenty years.

60863. I am aware that that is the period of the settlement, but is no other adjustment possible?—No other adjustment is made at all, and in the meanwhile the *karia* heads are reduced.

60864. Your point is that where modules have been introduced a disparity used to exist in the agricultural advantage of the man at the head of the canal as compared with the man at the tail, and that was reflected in a difference in the assessment; but now whereas that advantage is removed, the assessment remains, as it was before, weighted against the man at the head of the canal?—Yes.

60865. Is that the point?—Yes; that assessment remains the same but the advantage of the water has been reduced.

60866. Apart from that, does the presence of more water at the tail enable the zamindars at the tail to cultivate more land and to better purpose?—Yes, certainly.

60867. And to that extent they are paying more in terms of assessment, because land is only assessed when the crop is grown; is that so?—Yes.

60868. So that to that extent there is an automatic adjustment?—No, what the head people now complain of is that their area under cultivation is reduced. Formerly they cultivated five hundred acres, whereas now, owing to the introduction of modules, they can only cultivate three hundred acres. The economic position of the zamindars is completely disturbed; they are put in great difficulty. The zamindar has to evict his tenants or send them away because the area has been reduced and the water is transferred to the tail.

60869. If the area cultivated is reduced, the amount which a zamindar pays in terms of land revenue is also reduced, is it not?—Yes, the amount is reduced, but then he is subject to great hardship in that he cannot accommodate those people who live in his village who have been accustomed to live there for centuries; they cannot get the water they got before.

60870. How much substance is there left in your claim that, in terms of assessment, the introduction of a module brings about unfairness, if it is the case that any reduction in the total area of land cultivated on the property of the zamindar at the head is reflected in a reduced assessment?—For the advantage which the tail zamindar also gets he pays three rupees assessment per acre, whereas the headman pays four rupees. He gets the same advantage in water as the headman gets, whereas the headman pays a larger assessment.

60871. *Professor Gangulee:* How do you pay more assessment when your cultivated area has been reduced?—I pay four rupees for rice cultivation per acre while he (the tail man) pays three rupees per acre; it is the disparity in the pitch of the assessment per acre that we complain of.

The Chairman: He is concerned with the pitch of the land revenue.

60872. *Mr. Calvert:* You mentioned the question of mortgage banks. Is there any particular type of mortgage bank you wish to recommend?—No.

60873. Have you thought out the best way in which Government could assist the formation of mortgage banks?—No.

60874. *Sir Chunilal Mehta:* You said that the Agricultural Department has done nothing, and that crops which are not export crops are not being attended to. Is there no work being done on rice?—Yes, some work is being done. I do not say exactly nothing, but nothing substantial has come out of it.

60875. Mr. Thadani, as you know, was specially deputed to study research, and he has been appointed for the last five or six years?—I think he is doing more cotton work than rice work.

60876. Is there any other officer doing work on rice?—In my taluka there is no research station or experimental farm, but then I know of one at Larkana.

60877. Has any attempt been made to reduce smut and damage by stem borer in *juar*?—Not that I know of.

60878. Have any iron ploughs been introduced in Sind?—By iron ploughs, do you mean English-made ploughs?

60879. There are lots of them. The ploughs of Messrs. Kirloskar Brothers, for example?—We are using iron ploughs ourselves.

60880. The Agricultural Department have nothing to do with it?—They are exhibiting many forms of ploughs, but then we have not yet been able to select one that would suit rice land. I think the indigenous ploughs that we are now using are all right; we have made some modifications.

60881. In your note about cattle-breeding, you do not refer to the premium bull system in Sind. Do you know what the premium bull system is?—No.

60882. Do you know that Government are offering premium bulls at half the price *plus* ten rupees a month for maintenance, for the improvement of the breed of cattle?—I would have taken advantage of it, if I had known about it.

You may find it out from the Agricultural Department. That is one of the things which the Agricultural Department are doing.

60883. Are the figures of the total area cultivated, which you give on page 226, accurate?—Yes, they are quite accurate. They are taken from some official reports.

60884. I am told they are not quite accurate?—I know they have been taken from official reports.

60885. Let us turn to page 234. When was the new settlement introduced in the Guni taluka?—In 1913-14. It was due for re-settlement in 1923-24, but the old rates continue.

60886. Therefore, it is long ago?—Yes.

60887. If you look at the figures that you have quoted in column 2," collection of land revenue", the collection of land revenue has increased of course. That has also been accompanied by a great increase in the area cultivated?—Yes, but these figures indicate up to 1921-22, whereas the other figures, on page 226, go up to 1922-23.

60888. That scarcely matters. But you see there is an increase in the collection, and that must be accompanied by an increase in the area cultivated?—Yes.

60889. Take the years from 1905-06, or even further back, 1901-02?—There has been a steady increase in the collection of land revenue.

60890. Which necessarily means also an increase in the area cultivated, not exactly to the same extent, but in some proportion?—I could tell you where we have drawn these figures from.

60891. You suggest that without silt clearance cultivation cannot be advanced?—Yes.

60892. Then how do you explain this increase in cultivation?—On the contrary, I have shown that the cultivation has been decreasing, according to my statement on page 226.

60893. There you are comparing 1917-18 with 1922-23. We will not take that; there may be special reasons such as failure of the river in particular years. Let us take a long period for an average. How do you explain the increase in the area cultivated if silt clearance is not being attended to? If you get less water you get less area cultivated? Will that be the case?—It is not quite that way. Cultivation may go on, not without water, but on less water; all the same, it can go on. The only difference will be in the outturn. If a crop gets less water, it will make a difference in the outturn. All the people do not lessen their area of cultivation. In Sind, one does not know what kind of inundation there is going to be. One always prepares as large an area as one can for the next crop, and trusts to fortune whether one is going to get water for it or not. Therefore, because there is less silt clearance people will not lessen their area of cultivation; they will depend upon chance. Perhaps the inundation may be more favourable than in other years and they will go on cultivating as much as they can.

60894. But they pay assessment only on the area cultivated?—They pay assessment on the area they cultivate.

60895. The amount of assessment has gone up in the statement that you have given?—Yes.

60896. Therefore, the area must have increased, not decreased. You also compare that with the figures given in column 3, and you say that the amount spent on silt clearance is considerably less and it is steadily decreasing. Now take the figures for five years from 1900-01. The amounts spent are Rs. 36,000, Rs. 23,000, Rs. 36,000, and so on. For every rupee of that amount, you could in those days do probably two to three times as much as you can do to-day. Is not that the case?—Yes.

And yet the area under cultivation has increased. The amount spent has been reduced by one-third according to the statement; the work turned out by the money now spent has also been reduced by another half or one-third, and the area under cultivation has increased. You might think over those figures.

60897. On page 225 of your note, you are quoting Colonel Lambert, and the words he used are "a fixed proportion of the income for expenditure on canals". He does not specifically restrict it to silt clearance. A little further down on the same page, the quotation from Colonel Haig specifically mentions "expenditure on clearing and maintenance"?—Yes, but maintenance does not mean, I suppose, building of bungalows and other things.

60898. Certainly not. I want you to give me facts about these bungalows; we can stop them. What area are you referring to when you speak of bungalows. Can you give me instances? I will look into it?—Generally we find that money is now diverted to the non-essential factors of expenditure. For instance, building of bungalows for the residence of engineers, and gardens and wells attached to them, and such other items; whereas the cost of clearance is being diminished from year to year. That gives us the impression that what we require is not being attended to, whereas what the officers require for their own comfort is being provided.

60899. There is a distinction, therefore, between clearance and maintenance. You have given us figures about clearance; can you give us any idea as to what is being spent on maintenance?—I have got no figures. I would rather suggest that you may kindly obtain these figures.

60900. Will you be surprised to hear that on several canals we spend as much as we receive in assessment? Have you ever come across any such case?—No, I have not.

60901. Do you know how much of that has been spent on bungalows? Will you be good enough to give us some statement as to the amount spent on clearance as well as on maintenance, and the amount spent on bungalows? Do you suggest that bungalows are being built every year?—I think some provision is always being made for bungalows.

60902. Would it not be desirable to find out what is the proportion spent on bungalows?—I have not got the figures.

(The witness withdrew.)

Mr. J. W. N. Cumming, retired Extra Assistant Commissioner in Baluchistan, was next examined, for whose evidence, see Volume I, Part III. The Commission then adjourned till 10 a.m. on Wednesday, the 2nd November 1927, at Rangoon.

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Bondage to usurer, *Rahman* (143).
Business capacity, lack of, *Azimkhan* (104), *Hussain* (129).
Ceremonies, *Hussain* (129), 59876-7, *Azimkhan* (104), *Shahani* (202).
Cultivation expenses, *Rahman* (143).
Cultivation, wrong methods, *Shahani* (202).
social Customs, *Rahman* (143), *Dow* (37).
Debts, inherited, *Azimkhan* (104).
Deccan Agriculturists' Relief Act, *Shahani* (202).
Dishonesty, *Shahani* (202).
Education, lack of, *Karachi Indian Merchants' Association*, (183), *Shahani* (202).
Excavation, expenses of, *Khoso* (167).
Expenses, heavy, *Khoso* (167).
Ignorance, *Dow* (37).
Illiteracy, *Rahman* (143), 60134-6, *Hussain* (129), *Azimkhan* (404).
Improvements, *Shahani* (202).
Improvidence, *Shahani* (202).
Interest, heavy, *Khoso* (167), *Karachi Indian Merchants' Association* (183), *Azimkhan* (104).
Inundation, precarious, *Dow* (37), *Rahman* (143), *Hussain* (129).
Physical inefficiency due to bad housing and lack of hospitals, *Shahani* (202).
Poverty, *Dow* (37), *Rahman* (143).
Priestcraft, *Dow* (37), 59107.
Prosperity, *Dow* (37).
Seeds, high prices of, *Hussain* (129).
Taccavi, given to haris, want of control of, *Khoso* (167).
Taxation, high, *Khoso* (167), *Shahani* (202).
Thrift, lack of, *Karachi Indian Merchants' Association* (183).
Water deficiency, *Azimkhan* (104), *Khoso* (167), *Shahani* (202).
Yield, low, of agriculture, *Rahman* (143).

DECCAN AGRICULTURISTS' RELIEF ACT :

Administration at fault, *Hussain*, 59878-81.
Co-operative movement : village moneylender should be corrected by, and organisations such as the Taluka Development Associations, *Shahani* 60708-11.
causes Dishonesty and indebtedness, *Shahani* (202) 60660-2.
some Relief has been afforded by, but has not Functioned successfully, *Hussain* (130) 59875.
leads to Moneylender insisting on receiving a sale deed instead of a mortgage, *Shahani*, 60678-83.

DECCAN AGRICULTURISTS' RELIEF ACT AND ENCUMBERED ESTATES ACT :

Applicable to Sind, except a few sections; often used; effects good, *Azimkhan*, 59628-45, 59654-5.
Credit of cultivators decreased by, *Azimkhan* (105).
not applicable to Haris, who have no land, *Azimkhan*, 59761-4.
Sowcar gives mortgage loans in kind; only gives cash loans on a sale of land, *Azimkhan*, 59587-93.

AGRICULTURAL INDEBTEDNESS—contd.

DECCAN AGRICULTURISTS' RELIEF ACT AND ENCUMBERED ESTATES ACT—*contd.*

Encumbered Estates Act: *see under* Deccan Agriculturists' Relief Act and under **HUSSAIN.**
Extravagance, only true of 10 per cent. of the Zamindars, *Hussain* (130), 59876-7, not a fault of zamindars, *Shewakram*, 60845.
Haris: *see under* **LAND TENURE.**
Interest:
High rates of, *Azimkhan* 59798-9, 59810-5.
is really Insurance against risk, *Shahani*, 60564.
Irrigation: assured perennial flow would solve problem, *Shewakram* (224).
Land Alienation Act, necessary, *Azimkhan* (105), 59589-93; cultivators can borrow from co-operative societies, *Azimkhan*, 59637-45.
Legislation like Punjab Alienation Act would tend to reduce uneconomic borrowing, *Dow*, 59096-103.
Lloyd Barrage:
Cost of clearing land would not be very heavy and would not cause indebtedness, *Dow*, 59096-103.
Rise of price of land has increased borrowing; Barrage will therefore probably increase indebtedness which is not necessarily an evil, *Dow*, 59096-103.
Marketing: borrowers have to sell their produce to sowcars, *Khoso*, 60210-3.

MEASURES FOR LIGHTENING AGRICULTURE'S BURDEN OF DEBT:

Accounts, compelling money-lenders to keep, *Hussain* (130-1), *Shahani* (202).
Agriculture, should be made more profitable, *Bhutto* (67-8), *Karachi Indian Merchants' Association* (183).
Courts of equity, *Hussain*, 59882-97.
Credit:
Co-operative, *Dow* (37), *Khoso* (167), *Azimkhan* (105).
Facilities, *Hussain* (130-1), *Rahman* (143), 60134-6, *Karachi Indian Merchants' Association* (183), *Shahani* (202).
Education, *Rahman* (143), 60134-6, *Karachi Indian Merchants' Association* (183), *Shahani* (202).
Interest, reduction of, *Hussain* (130-1), *Karachi Indian Merchants' Association* (183).
Land mortgage banks, *Azimkhan* (105).
Legislation, *Dow* (37) 58973, *Karachi Indian Merchants' Association* (183).
Middlemen's profits, reduction of, *Karachi Indian Merchants' Association* (183).
Moneylenders Act, English, of 1900, application in India, *Hussain* (130-1).
Publication of prices of grain, *Khoso* (167).
Punjab Restriction of Alienation Act, *Hussain* (130-1).
Purchase and Sale, co-operative, societies, *Azimkhan* (105), *Hussain* (130-1).
Subsidiary industries, *Azimkhan* (105), *Karachi Indian Merchants' Association* (183).
Taccavi should be advanced to co-operative credit societies, *Khoso* (167).
Usurious Loans Act, *Hussain* (130-1).
Usury, in extreme cases should be made a criminal offence, *Hussain* (130-1) 59870.
Water supply, improvement of, *Shahani* (202).

MONEYLENDERS:

British judicial system favourable to moneylender at ruinous cost of cultivators, *Hussain* (130).
Exploit cultivators mercilessly, *Hussain* (130).
Profiteer as middlemen, *Hussain* (131), 59872-74.
Moneylenders Act (English) of 1918: some provisions of, should be applied to India, *Hussain* (131).
Mortgages: non-terminable, must be prohibited, *Hussain* (131); should be stopped, *Azimkhan* (105); should not be made; hereditary cultivators should be maintained, *Shahani* (202) 60580, 60656-9, 60694-5.
Non-agriculturists, tendency for land to pass into hands of, *Dow*, 59027; no classification of agricultural and non-agricultural tribes; will have to be made, but not necessarily the same classification as in the Punjab, *Dow*, 59045-9.
Poverty of cultivators due to lack of water and burdens on land, *Bhutto*, 59154-5, 59289.
Protective measures: apt to shake cultivator's credit and should be avoided, *Shahani* (202) 60564-5.

AGRICULTURAL INDEBTEDNESS—contd.

PUNJAB LAND ALIENATION ACT :
a Bad measure ; will divide Hindus and Mahommedans and will kill the small holder, *Shahani*, 60704-7.
necessary, *Hussain* (131).
will prevent Sellers obtaining market price for land and will cause land to accumulate in a few hands, *Shahani*, 60712-20.

REPAYMENT PREVENTED BY :
Crop failures, *Azimkhan* (104-5), *Rahman* (143). Pests, *Rahman* (143). Bad Seasons, *Hussain* (130). Inadequate yield, *Shahani* (202).
social Customs, *Dow* (37).
Dishonesty, *Shahani* (202).
Ignorance, *Dow* (37).
Interest, high, *Hussain* (130).
Inundation, capriciousness of, *Dow* (37), *Rahman* (143).
Marketing, inability to hold up produce for better prices, *Azimkhan* (104-5).
Method, lack of, in liquidating debts, *Hussain* (130).
Moneylenders, dishonesty and extortion of, *Rahman* (143), *Hussain* (130).
Mortgage of produce, *Rahman* (143).
Poverty, *Dow* (37).
Priestcraft, *Dow* (37).
Prosperity, *Dow* (37).
Restriction or control of credit of agriculturists only temporary remedies, *Bhutto* (68) ; inadvisable, *Shahani* (202) 60566-70.
Restricting tenure legislation : has reduced credit of agriculturists, *Shahani*, 60567.

SOURCES OF CREDIT :
Character, *Dow* (37).
Co-operative societies, *Azimkhan* (104), *Rahman* (143), *Shahani* (202).
Forward sales, *Azimkhan* (104).
Government, *Shahani* (202).
Land, *Dow* (37).
Moneylenders, *Azimkhan* (104), *Hussain* (130), *Rahman* (143), *Shahani* (202).
Taccavi, *Azimkhan* (104), *Rahman* (143).
Zamindars, *Shahani* (202).
Usurious Loans Act : danger of shaking cultivator's credit, *Shahani* (202) 60567 ; should be made applicable throughout India, *Hussain* (131) 59867-9.

AGRICULTURAL INDUSTRIES :
Basket-making : recommended, *Shahani* (205).
Bee-keeping : climatic conditions do not favour, *Rahman* (147) ; unknown, *Hussain* (132).
Cattle-breeding restricted owing to lack of pasture lands, *Azimkhan* (105). (*See under* **ANIMAL HUSBANDRY.**)
Cotton-ginning : recommended, *Shahani* (205).
Dairy farming : popular with cultivator ; modern methods and transport necessary, *Azimkhan* (105).
Employment, rural, might be increased by stimulating subsidiary industries, *Hussain* (132).
Fruit-growing :
Impossible for lack of irrigation during 8 months, *Hussain* (132).
Prevented by cultivator having no permanent interest in the holding and unfavourable conditions of water supply, *Rahman* (147).
Fruit and vegetable gardens introduced in Jamrao area, *Dow* (36).
Ghi-making :
Advocated, and profit, *Shahani*, 60584-9, 60675.
Government aid advocated, *Shahani* (205), 60676-7.
Implements, manufacture of locally, should be encouraged, *Musto* (91-2), *Karachi Indian Merchants' Association* (184).
Indebtedness might be relieved by, *Karachi Indian Merchants' Association* (183).

INDUSTRIAL CONCERNS MOVING INTO RURAL AREAS :
Effect doubtful owing to small number, *Hussain* (132).
Flour mills, Ginning factories and Rice hulling mills suggested, *Rahman* (147).
Government action desirable, *Azimkhan* (105-6).
Require full-time labour, *Musto* (92).

AGRICULTURAL INDUSTRIES—contd.

LAC CULTURE :

Possible to a limited extent, *Hussain* (132).
some Scope for ; practised wherever necessary material is available, *Rahman* (147).
Trees : babul and ber, *Aitchison*, 60343.
Leather goods, manufacture of, *Karachi Indian Merchants' Association* (184).
Leisure period from cultivation, available for : *Azimkhan :* (105), *Hussain :* (132), *Musto :* (92), *Rahman :* 60121-8, *Shahani :* (205).
Matches, manufacture of : possibility of ; a small factory exists, *Aitchison*, 60310-1.

OBSTACLES :

Agriculture occupies whole time, *Bhutto* (72).
Agricultural labour has been drawn to neighbouring factories and mills, *Bhutto*, 59279-80.
Apathy, *Azimkhan* (105).
Capital, Education and Initiative, lack of, *Shahani* (205), *Hussain* (132).
Objection to work other than agricultural, *Azimkhan* (105).
Transport, lack of, *Shahani* (205).
Oilseed crushing recommended, *Karachi Indian Merchants' Association* (184), *Shahani* (205) 60675.
Paper manufacture from rice straw in Lower Sind, a very useful supplementary industry, *Shewakram* (232).
Pisciculture ; no scope for, as large quantity of fish available naturally, *Rahman* (147), *Hussain* (132).

POULTRY REARING :

Government might encourage, ; done spasmodically at present but not scientifically ; might be successful, *Hussain* (132).
done on a Limited scale, *Rahman* (147).
Popular with cultivator, modern methods necessary, *Azimkhan* (105).
Recommended, *Shahani* (205).
Transport necessary, *Azimkhan* (105).
Preparation of agricultural produce for market, industries connected with : should be encouraged by Government grants-in-aid, *Bhutto* (72), *Hussain* (132).
Private enterprise should develop, *Musto* (92).
Rice-hulling : recommended, *Shahani* (205).

ROPE-MAKING :

to some Extent done, *Hussain* (132). Practised wherever necessary material is available, *Rahman* (147). Recommended, *Shahani* (205).
Scope for : not much, because haris do not lack employment, *Rahman*, 60125.

SERICULTURE :

Climatic conditions do not favour, *Rahman* (147); Impossible owing to climate, *Hussain* (132) ; Profitable at Bangalore, *Shahani* (204) ;
Spinning, recommended, *Bhutto* (72) ; *Shahani* (205) ; will not Pay, but cultivator will produce sufficient cloth for himself, *Bhutto*, 59149.

STUDY, INTENSIVE, OF EACH RURAL INDUSTRY :
Advocated, *Karachi Indian Merchants' Association* (184) ; Permanent board recommended, *Karachi Indian Merchants' Association* (184). *Hussain* (132). *Azimkhan* (106).
by practical Experts, necessary, *Musto* (92).
Subsidiary industries failing in competition with imported goods, *Bhutto* (72).
Sugar-making : recommended, *Shahani* (205), 60675.
Toys, wooden, *Karachi Indian Merchants' Association* (184).
Vegetable gardens introduced in Jamrao area, *Dow* (36).

WEAVING :

Cultivation should not be neglected for, *Shahani*, 60675. Government classes suggested, *Hussain* (132). Prejudice against, *Rahman*, 60127. Recommended, *Karachi Indian Merchants' Association* (183-4), *Shahani* (205), might be Successful, *Hussain* (132).

AGRICULTURAL LABOUR : (*See* also Labour *under* **LLOYD BARRAGE** and Haris *under* **LAND TENURE.**)

ATTRACTING LABOUR :

under Barrage grants of land should be made, *Rahman* (147-8).
Batai, liberal terms should be given, *Azimkhan* (106).
Grants of land suggested, *Bhutto* (72).
Haris, fair treatment of, recommended, *Azimkhan* (106).
no Measures necessary, *Dow* (38).
Small holdings for labourers recommended, *Azimkhan* (106).
Cheap labour an obstacle in adoption of heavy machinery and labour-saving appliances, *Rahman* (146).

CULTIVATION AND DEVELOPMENT OF AREAS NOT AT PRESENT UNDER CULTIVATION :

Necessity of measures in newly opened areas under the Barrage doubtful ; free Water should be given for two years if necessary, *Musto* (92-3).
Hari has no permanent interest in the land and therefore gravitates to where labour is wanted, *Dow* (38). (*See* Haris *under* **LAND TENURE.**)
Improved methods of cultivation would lead to demand for about four times as much labour, *Bhutto* (65).
Lloyd Barrage : population will be sufficient to cultivate new lands, because : conversion of lift into flow will release cultivators, decrease of idleness, improved methods of organisation, increase of population, *Dow* (39).
Migration : might be encouraged by free excursions, facilities for purchasing land, *Musto* (92).
Migration into Sind from dry tracts such as Cutch, Marwar and Baluchistan : when rains are good in these dry tracts, there is shortage of labour in Sind, *Azimkhan* (106).

POPULATION :

Sparse, while area of arable soil is very vast, *Azimkhan* (106), *Rahman* (147).
Sufficient for present needs of cultivation ; no surplus, *Rahman* (148).

Shortage :
Caused by :
Agriculture being unprofitable, *Bhutto* (72) 59294 ; Idling, *Khoso*, 60207-9, 60248 ; Irrigation facilities, increase of, *Azimkhan* (106);
Expected when Barrage is completed, *Rahman*, 60129-30.
Improved crops, cultivation of, prevented by, *Bhutto* (70).
in Jacobabad District, *Khoso*, 60207-8.
Labour-saving implements will be necessary, *Rahman*, 60129-30.
None in Sind except in rice-transplanting and reaping seasons, *Musto* (92).
Supplied normally by immigration from Baluchistan, etc., which should be encouraged, *Azimkhan* (106).

AITCHISON, P. E., Conservator of Forests, Sind Circle (175-80).

ADMINISTRATION :

Forests : should not be managed by local boards, 60335-7.

AGRICULTURAL INDUSTRIES :

Lac trees : babul and ber, 60343.
Matches, manufacture of : possibility of ; a small factory exists, 60310-1.

DEMONSTRATION AND PROPAGANDA :

Forestry methods on the Fuleli (176), 60321-7.

FERTILISERS :

Cowdung, use of, as fuel : not practised in forest areas ; huris (*which see under* FORESTS) should be encouraged, 60314-20.

AITCHISON, P.E.—contd.

FORESTS: (*See also under* **LLOYD BARRAGE.**)

Afforestation: a sound commercial proposition (176).
Agricultural purposes: fullest use being made for (175).
Babul:
grown on the Best lands, 60298; in 7 years grows to a Diameter of about 6 ins., 60290; Easily grown (175); is very susceptible to Frost, 60305; on Huris, the only tree sown, 60304; is a Lac tree, 60343; will be grown under Lloyd Barrage, 60285.
Bahan tree: timber used to manufacturing matches; difficult to grow artificially in river flooded areas because the seed is so light, 60310-1.
Cultivation by local cultivators after felling before being sown with *babul* (175).
Department: income and work, 60331-2.
Deterioration: due to lopping for fodder for camels and goats, stopped by restrictions (176).
Firewood:
Lloyd Barrage: will be adequate for increased population in main Valley of the Indus, but doubtful as to Eastern Nara, 60295, 60314-20.
Supply in rural areas generally adequate (175).
Grazing:
by Camels and goats, in young babul plantations, disastrous; can only be permitted in mature forests or scrub jungle and not in large numbers (175); allowed in 250 square miles, 60303; when Lloyd Barrage is working area will be reduced (175); complaints as to restrictions, 60280.
by Cattle does comparatively little harm while in many places it is good for forests; facilities granted freely (175); in 800 square miles, 60302; season begins after floods subside; most grazing April and May, 60297-9.
Fees: scale of, 60300, 60328-30.
Huris (privately owned woods):
Area about 20 to 30 square miles and is thought to be increasing; a great Asset to owners, should be encouraged by low assessment, grown on Fallow lands, fenced and rigidly protected, are very well Managed, owners copying methods of Government forests, give a good cash return to owners, Rs. 6 to Rs. 7 per acre per annum, Rotation of 7 years (175-6), 60314-27.
Babul (175) the only tree grown, 60304; grows very fast to a diameter of 6 ins. in 7 years; felled and sown with cotton and other field crops, 60290-2.
Timber mostly sold, 60288-9.
Kandi: like babul a thorny tree: will be grown under Lloyd Barrage, 60285-7.
Khathar and Khatro forests on the Fuleli:
Afforested during the past 15 years, Assured supply of water which can be regulated, used for Demonstration, excellent Development and financial returns, (176).
Lac trees: Mulberry: grows in the Punjab and can probably be grown in Upper Sind, babul and ber, 60342-3.
Local Boards: should not manage forest, 60335-7.
Tali: a kind of Blackwood, a plantation financially very Successful; Rs. 100 for a mature tree, 60338-41, a Timber tree, 60285.

IMPLEMENTS:

Forests: utilisation of labour saving implements unsuccessfully attempted, 60333-4.

LLOYD BARRAGE:

Forests:
Area: 70,000 acres set aside for, in blocks of varying sizes on old forests which under irrigation will grow excellent timber: babul, kandi and tali, 60281-7.
Experiments being made near Sukkur, 60308.
Huris (*q. v.*) will be irrigated at lower rates; very little water required except to start, 60293-4, 60305-7.
Grazing area for camels and goats will be diminished by (175).

SOILS:

Erosion:
Indus floods cannot be Stemmed by afforestation, owing to force of river and friable soil (175);
can not be Prevented by afforestation anywhere in Sind, 60296.

ALKALI LAND: *see under* **SOILS** and **LLOYD BARRAGE.**

ANIMAL HUSBANDRY :

Berseem, should be largely introduced, *Shahani* (204).

BHAGNARI CATTLE :

Bred in the north of Sind, should have Central breeding farm at Jacobabad, purely Draught, *Rahman* (146); bred for Military transport, not suitable for agricultural purposes, *Rahman*, 60010.

BULLS :

Ignorance of Government premium bull system, *Shewakram*, 60881-2.
should be Issued gratis from Government cattle stations to important villages, *Rahman* (147); and to zamindars, *Shewakram* (231).
Larkhana cattle a bit weak; bulls supplied by local board, Government paying half the cost, *Bhutto*, 59206-11.
Nadi breed; registers kept; *Bhutto*, 59206-11.

CASTRATION :

Increase in, by Burdizzo method, *Jerrom*, 59309.
not Successful over two years old, *Jerrom*, 59349-52.
Unknown; must be developed, *Rahman* (146) 60019-21.

CATTLE-BREEDING :

Agricultural Department in charge of, *Jerrom*, 59306.
Bhagnari and Cutchi cattle successfully imported to improve breed, *Khoso*, 60198-9.
stud Bulls in Government institutions, free access to, *Rahman*, 60064.
Central station for each breed essential, *Rahman* (146).
Export demand, *Rahman*, 60059-60.
Immediate attention needed as cattle are the only motive power, *Rahman* (146).
Lack of knowledge of principles of, among ordinary breeders, *Rahman*, 60063.
does not Pay except near towns where milk can be sold, *Rahman*, 60058-61.
Profitable, *Jerrom*, 59316-9.
Quality: in interior of Sind cattle all nondescript and poor, *Rahman* (146) 60006-7.
Restricted by lack of pasture lands, *Azimkhan* (105).
no Special arrangements made for, *Shahani*, 60611-4.
System unsatisfactory, *Rahman* (146).
Co-operative movement is not interested in, *Azimkhan*, 59529-32.
Dairies, private, should be encouraged by subsidies, grants of land, etc., to qualified men, *Shewakram* (231).
Dairy industry: unknown in Sind, *Bhutto* (71); Ruk dairy unprofitable and abandoned, *Bhutto* (71).
Dual purpose cattle, advocated, *Rahman*, 60166-7.

FODDER :

Abundant Supply from rice cultivation, *Bhutto* (70).
Bajri grown, *Rahman*, 60171.
Berseem: has been tried, *Rahman* (145); no prospects for until cold weather water supply; would solve fodder supply to a great extent, *Rahman*, 60056-7.
Cost of growing natural grass with canal water, *Dow*, 58946.
Dry, is sold; cattle are fed during the busy season and starved during the remainder of the year, *Rahman* (147).
Green, insufficient during hot weather, *Rahman* (146); shortage seriously affects milk supply from December to July, *Rahman* (147).
Juari should be grown for fodder, *Shahani*, 60588-9.
Scarcity:
Greatest between October and July, *Shahani* (204), in Lower Sind, greatest in May and June; green fodder available from August, *Shewakram* (232).
Storage: not necessary, *Rahman*, 60131-2; not stored in silos but in heaps, *Rahman*, 60172-3.

GRAZING :

"Huri" grants should be made by Government for growing babul trees and natural grasses, to be managed by the villagers co-operatively, *Rahman*, (147).
Insufficient owing to non-cultivation and inadequate irrigation facilities, *Rahman* (146).
Insufficient grounds, *Azimkhan* (105).

ANIMAL HUSBANDRY—contd.

KARACHI OR RED-SINDHI CATTLE :

Export, large, to Java, Formosa and Celyon, for milking, *Jerrom*, 59316-22.
Indian, pure, no non-Indian blood, *Jerrom*, 59308.
thrive in Japan, etc., *Rahman*, 60168-70.
Milch, purely, *Jerrom*, 59307.
Purity : the only definitely pure type, *Rahman*, 60015-7.
Quality : recognised as the best milk-producing cow in India, *Rahman*, (146).
Lift irrigation by pumping would release cattle for field work, *Dow* (38).

PASTURES, common, in villages :

Disappearing owing to encroachments for cultivation ; should be restored, *Shahani* (204).
Equilibrium between cultivator and pasture has been lost, *Shahani*, 60584-9.
would encourage Ghee making, *Shahani*, 60584.
Scarcity of, owing to lack of water and greed of zamindars who utilise all available land for cultivation, *Shewakram* (231).
Shows, cattle, should be held in each taluka, *Rahman* (147).

THAR PARKAR OR DHATTI CATTLE :

Dual purpose, *Rahman* (146).
not Pure bred, all mixed, *Rahman*, 60017-8, 60174-5.
breeding Station to supply draught advocated, *Rahman* (146), 60174-5.

ARBITRATION of disputes :
Advocated, *Karachi Indian Merchants' Association* (183), 60478-85.
through Panchayats and communities, advocated, *Shahani* (203).

AZIMKHAN, KHAN BAHADUR INAYATALIKHAN, Assistant Registrar, Co-operative Societies in Sind (103-28) Experience, 59485-92 ; 59765-9.

AGRICULTURAL DEPARTMENT : Co-ordination with Co-operative Department.

Assistant Registrar of Co-operative societies acting as Agricultural Propaganda Officer 59604-13.
Already closely linked, 59513-4.
Co-operative Department should not be in charge of agricultural Propaganda, 59656-7. 59756-9.
Has been successful in improving state of cultivators (103).

AGRICULTURAL INDEBTEDNESS :

Causes of borrowing : inherited debts, illiteracy and want of business capacity, heavy interest, ceremonial expenses, inadequacy of water supply (104).
Deccan Agriculturists' Relief Act and Encumbered Estates Act :
Applicable to Sind, except a few sections ; often used ; effects good, 59628-45, 59654-5.
Credit of cultivators decreased by (105).
not applicable to Haris, who have no land, 59761-4.
Interest : rates charged by sowcars 59810-5.
Land Alienation Act, necessary (105), 59589-93 ; cultivators can borrow from co-operative societies, 59637-45.
Measures for lightening agriculture's burden of debt : co-operative credit societies and land mortgage banks, purchase and sale societies, subsidiary industries (105).
Mortgages, non-terminable, should be stopped (105).
Repayment prevented by : crop failure and inability to hold up produce for better prices (104-5).
Sources of credit : sowcars, co-operative societies, taccavi, forward sales (104).
Sowcar gives mortgage loans in kind ; only gives cash loans on a sale of land 59587-93.

AGRICULTURAL INDUSTRIES :

Cattle-breeding restricted owing to lack of pasture lands (105).
Dairy farming : popular with cultivator ; modern methods and transport necessary (105).
Health lectures should be given in villages to induce cultivators to devote their spare time to improving health conditions (106).

AZIMKHAN, K. B. INAYATALIKHAN—contd.

AGRICULTURAL INDUSTRIES—*contd.*

Industrial concerns, establishment in rural areas advocated; Government action desirable (105-6).
Leisure period: April to December work on the fields; during the slack season dry ploughing, marketing, clearing water courses, collecting manure, rearing cattle; most cultivators remain idle during slack season (105).
Obstacle: objection to work other than agricultural, and apathy (105).
Poultry keeping: popular with cultivator; modern methods and transport necessary (105).
Study, intensive, of rural industries worth trying (106).

AGRICULTURAL LABOUR:

Attraction of labour: should be by giving liberal terms of batai; fair treatment of haris; village sites, water and small holdings for labourers (106).
Migration into Sind from dry tracts such as Cutch, Marwar and Baluchistan: when rains are good in these dry tracts, there is shortage of labour in Sind (106).
Population, sparse, while area of arable soil is very vast (106).
Shortage supplied normally by immigration from Baluchistan, etc., which should be encouraged (106); shortage caused by increased irrigation facilities (106).

ANIMAL HUSBANDRY:

Cattle-breeding restricted by lack of pasture lands (105).
Grazing: insufficient grounds (105).

CO-OPERATION:

Agricultural Department, co-ordination with: *see* Co-operative Department under AGRICULTURAL DEPARTMENT.
Animal husbandry, co-operative societies do not take an interest in, 59529-32.
Audit: satisfactory; on every society every year by the Government auditor; takes two or three days, 59508-10.
Central Banks:
Deposits derived from local sources, 59736.
Directors of, 59724.
appoint Inspectors of primary societies, 59781-3.
Progress of, 59506-7.
Voting by societies and individual members, 59725-35, 59790-3.
Central Co-operative Institute, Bombay, and branches: best non-official bodies for propaganda and development; Government might subsidise (108) 59542.
Credit societies:
the Best means of financing cultivators and should be developed (104). (*See under* Progress).
Debt redemption loans generally for 5 years, secured on land mortgage, 59544-8;
Interest of moneylenders being lowered by influence of co-operative movement, 59549.
Loans for land improvement, seeds, manure and current needs; managing committee exercises great care to see that loans for land improvement are spent for that purpose, 59577-85, 59784-6.
Maximum loan ordinarily Rs. 500, but up to Rs. 1,000 on the sanction of the Registrar, 59586.
Moneylenders: members of societies more than 3 years old do not borrow from (108), 59543.
Repayments regular: re-issue of loan after some time, not on the same day, 59553-4.
Development: should come from the people, not from Government (107).
Education:
Co-operative Institute for Sind with headquarters at Hyderabad, 59500-505.
Facilities: education by annual conferences, training classes for committee members, secretaries and honorary organisers, 59498-500.
Illiteracy prevents spread of co-operation, 59550.
Managing committee classes, 59770-5, 59787-9.
Floods, recent:
societies Distributed 2 lakhs in loans, 59602-3.
Government should make advances at 5 per cent, 59698-9.

AZIMKHAN, K. B. INAYATALIKHAN—contd.

CO-OPERATION—*contd.*

Floods, recent :—*contd.*
Housing societies being formed, 59602-3.
Fuel, wood, not grown co-operatively, 59528.
Haris :
Enlisted in societies (108).
when obtaining Loans must give credit of a landholder (108), 59573-5, 59599-601.
are Members of seed supply societies, 59824-5.
impossible to form Special societies for haris to make them independent of zamindars, 59674-83, 59692-4, 59743-6.
no Statistics as to proportion of membership, 59674-7.
Housing Societies :
Bombay Government make advances at 5 per cent, 59698-9.
being Organised in connection with recent floods, 59603.
Illiteracy prevents spread of, 69550.
Liquidation :
Extent of, and when action taken 59493-6.
Organisers, honorary, sometimes employed as liquidators, but not in their own locality, and generally liquidation is done by paid Government officials, 59716-23.
Registrar orders liquidation, after enquiry, on report of auditors, inspecting officials or honorary organisers, 59711-5.
Management :
Central Banks appoint inspectors of primary societies, 59781-3.
Managing Committee : Secretaries generally agriculturists ; have sufficient education, 59558-62.
Meetings : annual conferences in every district and central conferences in the vernacular, 59497-505.
Non-credit societies : require business capacity ; special propaganda officers necessary (107), 59511, 59537, 59653.
Organisation : enquiry held before formation of primary society, 59572.
Organisers, honorary : necessary (107) ; about 16 district honorary organisers ; doing good work ; movement mainly guided by non-officials, 59537-42, 59776-80.
Managing Committee and Secretary, 59558-62 ; honorary organisers unpaid but get travelling allowance ; are trained agriculturists and Chairmen and Secretaries of societies ; supervising work of primary societies ; recommend liquidation ; enquiry held ; sometimes act as liquidators, but not in their own locality, 59702-23.
Progress :
more valuable Crops cultivated and greater yield, crops held up for better prices. 59800-1.
Members learning thrift and investing more than they are bound to invest, 59576, fairly Satisfactory ; in 1918 only 63 simple credit societies, membership of nearly 3,000 and working capital 1½ lakhs ; 1927, over 900 societies, membership nearly 40,000, working capital nearly 1½ crores (108), 59737-42 ; about 800 agricultural credit societies, 59816-8.
Purchase societies :
Area of operations should be widened (108).
Seed should be purchased from Government Stores Department, 59695-7, 59820-5.
should be Supplied from large central agency with Government assistance of finance and technical advice (108).
Sale societies :
Cotton, none started yet, 59535-6 ; not necessary to start ginning factories first or to make crop advances, 59684-7.
Difficulties : merchants contracting forward sales, transport, co-operative societies cannot quote forward prices (109).
Government assistance should be given (109).
Loans should be made to cultivators on crops while waiting for better prices (108-9).
Management, investigation as to, 59537.
need of Marketing credit to enable cultivators to wait for better prices, 59525-7.
Necessity of, in view of trickery of middlemen (108).
Progress of, 59511-2.
Staff of, 59537, 59702. (*See* "Organisers, honorary", above.)
Supervising unions :
Non-official bodies which play an important part (108).
do Propaganda work, 59523.
have not such a wide field as Taluka development associations, 59802-3.

AZIMKHAN, K. B. INAYATALIKHAN—contd.

CO-OPERATION—*contd.*

Sweepers :—*contd.*

societies started in Karachi, 59810-5.
no societies for in the Villages, 59747.
Taluka Development Associations : *see under* that heading.
Zamindari banks :
Finance : limited liability ; nearly 1 lakh of rupees shares in each bank ; Rs. 50 per share ; deposits, and loans from Sind Central Bank, 59749-54.
Larkana Bank serves the whole district, 59748.
Loans made on mortgage of land ; 7½ per cent. in arrears ; share system popular, 59749-60, (108), 59574, 59663-5.
Progress : being organised (104) ; 3 have been established and are working satisfactorily (108).
Thar Parkar Bank serves only two divisions, 59748.

CROPS AND CROP PROTECTION :

Seeds :
Cotton : 27 W. N. and Bhitshah, Wheat : Pusa 12 greatly appreciated (103).
Government Stores Department, should supply, 59695-7.

DEMONSTRATION AND PROPAGANDA :

Co-ordination of Agricultural and Co-operative Departments has been beneficial (103).
on Cultivators' own fields by organised bodies of zamindars and cultivators, *e.g.*, taluka development associations (*q. v.*) ; comparative plots (103), 59624-7 ; more successful than leaflets, pamphlets, etc. (103-4).
Improvements, list of, (103).

FINANCE :

Land mortgage banks :
Objects : for loan redemption and to finance big schemes of land improvement (104).
should be Organised, with power to issue debentures (104).
should not Wait to see whether experiments in other parts of the Presidency are successful, 59666-8.

TACCAVI :

Administration : should only be given for land improvement schemes through co-operative societies where such exist (104).
Defects : at present amounts inadequate and not given at proper time of the year, 59669-73.

HARIS :

in view of Labour scarcity, should be treated humanely and equitably in order to attract labour from surrounding areas (106).
Relationship with zamindars, 59594-8, 59674-83.
Scarcity of : 59679-80.

IMPLEMENTS :

Ploughs :
Egyptian replacing Sindhi ; is as simple as Sindhi plough and can be manufactured locally, but its work is far superior, especially in soft soil (103).
Meston : iron plough as cheap as Egyptian and fit for hard soil (103).
Types : Egyptian, Meston, Rajah, Chatanuga, Monsoon, found useful (103).

IRRIGATION :

Screw water lift, found useful (103).

MARKETING : (*See* also Sale Societies *under* CO-PERATION).

Cotton :
Conditions unsatisfactory (106).
not Graded (107).
Information : daily market quotations, etc., should be made available to cultivators by Government (107).
no regular Markets (107).
Method of (107) Middlemen : number excessive (107).
Premium seldom paid to cultivators for improved quality (108).
Sowcar, cultivator at the mercy of, (107).
Credit, need of, to enable cultivators to wait for better prices, 59525-7.

AZIMKHAN, K. B. INAYATALIKHAN—concld.

MARKETING—*contd.*

Facilities: defective, (106-7).
Legislation: Marketing Bill should be enacted (107), (109), 59598.
STATISTICS:
Haris: statistics as to proportion of membership of co-operative societies desirable, 59674-7.

TALUKA DEVELOPMENT ASSOCIATIONS:
Activities of, (103-4) 59515-21, 59819.
Animal husbandry: do not take part in, 59529-32, 59804.
Co-operation: play an important part in developing (108); are registered as non-credit co-operative societies, 59515-20, 59524, 59563.
Controlled by executive committee (103).
Effect of, 59569.
Finance and members' subscription, 59522-7, 59569-71, 59646-52,
Management: membership (103), 59564-8. 59566.
Programme of work framed with advice of Agricultural Department (103).
Progress: founded about four years ago, 59533-4.
Propaganda, best media for (103-4), 59523.
one Sufficient for each taluka, 59614-23, 59802-9.

WELFARE OF RURAL POPULATION:
Co-operative societies, where they exist, have effected a distinct improvement in life of agriculturists (108).
Propaganda necessary: lectures on sanitation, use of quinine, breeding of mosquitoes, purification of wells, refuse disposal (106).
Quinine:
Propaganda as to use of necessary (106).
Taluka development associations distribute free, 59521.
Refuse disposal: propaganda necessary (106).
Village sanitation committees will spring up as the result of sanitation propaganda (106).
Wells, purification of: propaganda necessary (106).

BATAI, *see under* **LAND TENURE.**

BABUL, *see under* **FORESTS.**

BANKS, *see under* **CO-OPERATION** *and* **FINANCE.**

BERSEEM, *see under* FODDER *under* **ANIMAL HUSBANDRY.**

BHUTTO, KHAN BAHADUR SHAH NAWAZ KHAN, C.I.E., O.B.E., Chairman of Larkana District Co-operative Bank (65-84). Holds about 10,000 acres cultivated by tenants on batai system 59133-7

ADMINISTRATION:
Centralisation always to be deprecated (67).
District local boards should undertake rural education (66), and welfare of rural population (73).
Meteorological Department: useless to agriculturists (67); information as to rainfall in Punjab and Himalayas should be published in local vernacular newspaper, 59212-5, 59302.
Posts and Telegraphs: satisfactory (67).
Roads: Serious consequences of lack of (67); Government, not district local boards, to blame; tolls have been introduced and an additional road cess should be imposed 59264-7.
Sind should have separate Government (67) 59297.

AGRICULTURAL DEPARTMENT:
Funds, lack of, prevent thorough efficiency (67).

AGRICULTURAL INDEBTEDNESS:
Cause of borrowing: unprofitableness of agriculture (67).

BHUTTO, K.B. SHAH NAWAZ KHAN—contd.

AGRICULTURAL INDEBTEDNESS—*contd.*
Measures to lighten agriculture's burden of debt : to make agriculture more profitable (67), (68).
Poverty of cultivators due to lack of water and burdens on land : 59154-5, 59289.
Restriction or control of credit of agriculturists only temporary remedies (68).

AGRICULTURAL INDUSTRIES :
Leisure period : cultivator toils throughout the year (71-2) ; on one-crop land he plies bullock carts for hire or clears kariyas for three or four months (76).
Obstacles : agriculture occupies whole time of males and females (72) ; agricultural labour has been drawn to neighbouring factories and mills, 59279-80.
Preparation of agricultural produce for market, industries connected with : should be encouraged by Government grants-in-aid (72).
Spinning, hand : should be encouraged (72) ; will not pay but cultivator will produce sufficient cloth for himself, 59149.
Subsidiary industries failing in competition with imported goods (72).

AGRICULTURAL LABOUR :
Attracting labour : by grants of land (72).
Improved methods of cultivation would lead to greatly increased demand for, (65).
Scarcity of labour : is caused by unprofitableness of agriculture (72), 59294 ; and prevents cultivation of improved crops (70).

ANIMAL HUSBANDRY :
Bulls : Larkana cattle a bit weak ; bulls supplied by local board, Government paying half the cost ; Nadi breed ; registers kept, 59206-11.
Dairy industry : unknown in Sind ; Ruk dairy unprofitable and abandoned (71).
Fodder :
Shortage does not normally exist, owing to Indus, except in Thar Parkar, (71), 59293.
abundant Supply from rice cultivation (70).
Local Government should undertake improvement (71).

BATAI SYSTEM : *see under* LAND TENURE.

CAPITAL, ATTRACTING OF, TO AGRICULTURE :
Profits of agriculture must be increased by decreasing burden of assessment and by providing flow irrigation (73).

CO-OPERATION :
Credit societies : most are sound ; directors of local banks decide whether loans are to be granted, 59168-81.
Government should purchase grass for Military Department through co-operative societies, 59288.
Interest :
Government funds should be used to finance primary societies, 59188-90, 59285-7.
rates paid by Primary societies must be reduced (73).
Larkana District Co-operative Bank : advances money to primary societies to whom members apply ; makes no advances to individuals (77), 59170 81.
Lift irrigation by pumping might be done by Co-operative societies (83) 59286-7.
Minorities should be compelled to come into schemes for joint improvement (73) ; but consent of a majority of 75 per cent. necessary (80) 59225-6.
Progress : fairly good (73) 59166-7.

CROPS AND CROP PROTECTION :
Improvement impossible owing to shortage of labour (70).
Pests : research required (65) ; protective measures have all failed (70).
Rice :
Income about Rs. 40 per acre, 59246-52.
most Profitable crop in view of shortage of labour and its fodder yield ; should be encouraged to the exclusion of all other crops (70).
Seed : increasing economy in use of (70).
Wild-animals, damage by : local authorities giving necessary licenses (70).

CULTIVATION :
Interference inadvisable (70).
Rotation : correct methods in use (70).

BHUTTO, K.B. SHAH NAWAZ KHAN—contd.

DEMONSTRATION AND PROPAGANDA :
Activities of Department should be increased (66); more funds required, 59161-2.
Personality of officers, importance of (66).

EDUCATION :
Agricultural :
Careers, after, of students, disappointing (66).
should be Compulsory for all schools (66), 59156-9.
Facilities urgently require extension throughout Sind (66).
Farms should be attached to rural schools (66), (73).
Land should be given to students on leaving school (66).
Progress : not marked (66).
Pupils not drawn from agricultural classes (66).
Teachers should be drawn from agricultural classes (66).
Attendance at school limited by work in the fields and religious instruction (73).
Compulsory education : being introduced but difficulties of scarcity of labour and lack of appreciation (73).
District local boards, should control schools (66).
Middle class youths, attraction of, to agriculture : by making agriculture more profitable (66).

FERTILISERS :
Cowdung, use of as fuel, due to lack of other fuel (70).
Firewood, supply of, 59144-8.

FINANCE :
Failure of agricultural finance owing to agriculture being unprofitable (67).
Long term loans :
Demand for, not very great; about 10 years; maximum of Rs. 10,000 to Rs. 20,000 lent by co-operative societies; to redeem mortgaged property, 59182-7.
not Wasted, 59291-2.
Taccavi : interest too high, leakage between Government and borrower, undue strictness as to repayments (67-8), 59299-300.

FORESTS :
Afforestation : no space for, near villages (72).
District Local Boards :
should Control forests (72).
would give greater Grazing facilities, 59290.
Firewood, supply of, (72), 59144-8.
Grazing facilities, inadequate (72).
Prices for grass from forests too high (72).
Village plots should exist for supplying grass and firewood (72).

HOLDINGS :
Fragmentation : Mahommedan law of inheritance is ruinous (68).
Fragmented Holdings Bill, 59298.
Legislation necessary absolutely prohibiting sub-division below a certain point (68), 59222-4.

IMPLEMENTS :
Government should allot more funds for purchase of improved implements and free distribution (if possible) among cultivators (66-7); (70).
Prices : should be reduced by means of Government bounties (71).
Repairs, importance of providing facilities for (70).
no great Successes (67), 59165-6.
Threshing machines and tractors should be let out on hire by Agricultural Department (66-7); through Co-operative societies, 59301.

IRRIGATION :
Distribution: not satisfactory, and suggestion, (69), 59296.
Floods : no measures to prevent in many places (68).
Kotri, barrage should be made (69), 59295.
Lift irrigation by pumping might be done by co-operative societies, 59286-7.

BHUTTO, K.B. SHAH NAWAZ KHAN—contd.

IRRIGATION—*concld.*
Minor schemes (tanks, ponds, wells): enough being done (69).
Neglect of, in Sind (68).
Non-Barrage zone, adversely affected by Lloyd Barrage (69), 59295.
Punjab irrigation schemes, adversely affecting water-supply in Sind (68), 59295.

LAND TENURE:
Batai system:
Division of produce: on lift lands zamindar takes two-fifths, on flow lands half the produce; a fair arrangement, 59135-43.
Rent paid in kind, 59227-36.
Zamindar pays assessment, advances taccavi and pays interest, clears kariyas, etc., 59195-8.
Burdens on land:
local Cesses; rasai (providing for touring officials); lapo paid to officials who collect revenues; corruption; system of administration blamed; committee appointed as to rasai and lapo, but nuisance remains 59253-63; should be discouraged; rasai and lapo come out of zamindar's share of porduce, but hari has to contribute labour; touring officials should only accept hospitality from well-to-do people, 59281-4.
cause Poverty of cultivators, 59154-5.
Settlement every 20 years, 59227-36.
Haris: except one class, are all tenants-at-will, but in fact are seldom turned out, 59227-8.

LLOYD BARRAGE:
Zamindars anxiously awaiting completion, 59193-4, 59216-8.

MARKETING:
Facilities satisfactory (72).
Government should not interfere in packing, grading, etc., for market (72), 59278.
Information as to market conditions, etc., should be provided by co-operative societies (72).
Railways should give priority to agricultural produce (72).
Roads should be improved (67).

RESEARCH:
Diversity of conditions necessitating many kinds of research (65).
Implements, 59164.
Kallar land, research required into factors producing (65).
Pests, research required (65).
Poverty of cultivators prevents use being made of results of research, 59140, 59154-5, 59219-21.

SOILS:
Alkali land: only method of improvement is by supply of water and drainage (69).
Erosion, on Indus, money should not be spent on prevention of (69).
Government should not attempt improvement of (69).
Reclamation: by giving land to peasant class (69).

STATISTICS:
often Invented owing to pressure of work (74).
Sufficient at present (74).

VETERINARY:
Department:
under Director of Agriculture, should be (71).
Funds, lack of, prevents thorough efficiency (67).
Dispensaries:
under District local boards, who have not proper control of officers (71).
Extension taking place (71).
Provincial authority, should not be under (71).
Touring, visits are too short (71).
Use of, by agriculturists, prevented by distance (71).
Legislation necessary to prevent spread of contagious disease by contacts (71).
Research: Institute required in every Province (71) 59241-5.

BHUTTO, K.B. SHAH NAWAZ KHAN—concld.

WATERLOGGING: In the Lar portion, causes idleness; no system of drainage, 59237-40.

WELFARE OF RURAL POPULATION:
District local boards:
will provide Health officers, Government conributing two-thirds of expense, 59191-2.
subject has been Transferred to; they may be trusted to provide all that is necessary (73).
Surveys, economic, of typical villages not very helpful (73).

BORROWING, *see under* **AGRICULTURAL INDEBTEDNESS.**

BOSI, *see under* **CULTIVATION.**

CAPITAL, ATTRACTING OF, TO AGRICULTURE:
Capitalists are not encouraged to take up land, *Shewakram*, 60823-8.
Improvement of land discouraged by:
Capital and Enterprise, lack of, *Rahman* (149), *Shewakram* (232-3).
Conservative habits and Ignorance, *Shewakram* (232-3).
Long term credit at low interest necessary, *Rahman* (149).
Lloyd Barrage: will attract capital, *Rahman* (149).
Obstacles: dulness of country life and precarious seasons, *Rahman* (149).
Profits of agriculture must be increased by decreasing burden of assessment and by providing flow irrigation, *Bhutto* (73).
Waste land, grant of, at nominal prices or payment by instalment, to individual capitalists or companies, with facilities for constructing canals, advocated, *Shewakram* (232).
Water-supply must be assured, *Musto* (94).

CASTRATION, *see under* **ANIMAL HUSBANDRY.**

CENTRAL COTTON COMMITTEE: unsatisfactory; no criticism allowed; exclusion of best men, *Shahani*, 60553-5, 60673-4.

CO-OPERATION *see* also *under* **AZIMKHAN, K. B. INAYATALIKHAN.**
Agricultural Department, co-ordination with: *see under* **AGRICULTURAL DEPARTMENT.**
Amateurs, employment of undesirable, *Musto* (93).
Audit: satisfactory; of every society every year by the Government auditor, *Azimkhan*, 59508-10.
Cattle breeding societies, doubtful, *Musto* (94).
Consolidation of holdings: Societies should undertake, *Musto* (94).
holdings already Uneconomic should be aquired by the State, *Musto* (94).
Cotton ginning and marketing societies advocated, *Shahani* (205).

CREDIT SOCIETIES:
Collapse of a society in Jacobabad District owing to non-repayment of loans, *Khoso*, 60214-7.
should be Developed to supply all needs of cultivators for short term credit, *Shahani* (201).
Directors of local banks decide whether loans are to be granted, *Bhutto*, 59168-81.
Necessary to save cultivators from merciless exploitation of banias, *Hussain* (131):
Number has increased very greatly in the last few years, *Rahman* (148).
most are Sound, *Bhutto*, 59168-81.
Success of, *Hussain* (133).
Taccavi grants should be made to, *Khoso* (167).
Domestic current expenses, credit should be provided for, *Musto* (93).
Expert from Sweden, Denmark or England should be employed by Government, *Musto* (93).
Failure, instance of, *Dow* (39).
Fertilisers distributed through societies, *Rahman*, 60156-62.
Fragmentation of holdings should be prevented by, *Karachi Indian Merchants' Association* (183).
Government: should confine its activities to propaganda, organisation, finance and audit, *Hussain* (132).
Government should purchase grass for Military Department through co-operative societies, *Bhutto*, 59288.

CO-OPERATION—concld.

Implements: societies might Hire out, maintain Repair depôts for, and keep Stocks of, *Musto* (91-4), *Rahman*, 60155-9.
Importance of, great, *Musto* (93).
Improvement of land for general benefit of locality should be financed and carried out on a co-operative basis, *Musto* (94).

INTEREST:
Government funds should be used to finance primary societies, *Bhutto*, 59188-90, 59285-7.
rates paid by Primary societies must be reduced, *Bhutto* (73).

JOINT FARMING SOCIETIES:
Advocated to prevent excessive fragmentation of holdings, *Shahani* (202).
Doubtful, *Musto* (94).
of Educated young men:
on Lloyd Barrage land, desirable if members do manual work themselves, *Karachi Indian Merchants' Association* (192).
Might be tried, *Rahman*, 60118.
Premature; would receive sympathetic treatment, *Dow* (39), 59073-4, 59122-9.
Failed in Punjab, *Dow*, 59053.
of Haris, worth while trying as an experiment, *Rahman*, 60103-4.
Larkana District Co-operative Bank: advances money to primary societies; makes no advances to individuals, *Bhutto*, 59170-81.
Lift irrigation by pumping might be done by Co-operative societies, *Bhutto* (83), 59286-7.
Lloyd Barrage Scheme: purchasers of land might be financed by credit societies, *Dow*, 58930-1.

MINORITIES:
should be Compelled to come into schemes for joint improvement, *Dow* (39), 59029, 59075, 59130; *Musto* (94); *Bhutto* (73).
Expert approval of scheme, a condition, *Musto* (94).
Majority of 75 per cent. necessary, *Bhutto* (80), 59225-6.
Non-credit societies: with two exceptions, not organised, *Rahman* (148).

NON-OFFICIALS:
more Effective than Government in spreading movement, *Rahman* (148); command more confidence; are coming forward, *Rahman*, 60069-70.
should Encourage co-operation by propaganda and education, *Hussain* (133).
Once Trained Officers should be retrained, *Musto*, 59434-8.

Progress:
Considerable, *Dow*, 58983-5.
has made an Important contribution to welfare, *Hussain*, 59828-30.
Pumping schemes to be run by co-operative societies, *Dow*, (37), 59076.
Punjab consolidation of holdings societies being studied, *Dow* (39), 58974-6, 58982.

PURCHASE AND SALE SOCIETIES:
Necessary, to save cultivators from clutches of banias, *Hussain* (131-3).
Purchase, should Stock, sell and hire out implements and machinery, *Musto* (93).
Sale of produce and stock, requires expert investigation, *Musto* (94).
Rectangulation of holdings in the Lloyd Barrage area should be done with the assistance of co-operative societies, *Dow* (39).
Seed depots: might be financed by Government and managed by co-operative societies. *Musto* (89).
Seed distribution: should be undertaken by credit societies, *Dow* (38).
Seed supply societies, necessary, *Hussain* (131-2).
Zamindars, big, not yet affected by, *Hussain*, 59830.

COTTON, *see under* **CROPS AND CROP PROTECTION, LLOYD BARRAGE, MARKETING** *and* **SOILS.**

CROPS AND CROP PROTECTION:
Cattle straying, damaging crops: serious; quick growing hedge plant should be evolved, *Karachi Indian Merchants' Association* (184), 60518-9; prickly pear, does not injure crops, grows quickly and supplies itself with water but gives no crop or fuel, *Karachi Indian Merchants' Association*, 60526-8.
Cereals: selection of seeds of selected varieties, recommended, *Shahani* (204).

CROPS AND CROP PROTECTION—contd.

COTTON :

Acala, American, the best variety ; being grown at Sakrand Farm, *Shahani*, 60562-3 ; 60618-24.

American, long staple :

should be Concentrated on under Barrage perennial water supply, *Dow* (38).

Profitable, *Shahani* (204).

Punjab 4 F :

Qualities : has proved to be healthy and prolific, fitting in with present conditions of water supply and possibly other environmental conditions ; popular, superior staple strain should be evolved, *Rahman* (145), 59983-7.

Quantity : 36,000 acres on Jamrao Canal, 1926-27, *Rahman* (145).

285 better than F.4, *Shahani*, 60541.

Spread of checked by unsuitable water conditions, *Dow* (38), and marketing conditions leading to cultivator not getting fair share of higher value, *Dow*, 58977-9.

Water supply in February or March necessary, *Shahani* (204).

Baker-Lane scheme does not provide for much cotton cultivation under Lloyd Barrage, *Rahman*, 60179.

in Deccan might be grown under irrigation instead of sugarcane, *Harrison*, 58846-7.

Deshi, Agricultural Department has attempted to improve in the past, because of unstable water supply, *Dow* (38).

Egyptian :

Cultivated under Fletcher for nearly 5 years, varieties tried, *Rahman*, 59998-9, 60002-4.

Experiments abandoned except at Sakrand with fresh seed from Egypt, *Rahman*, 60041-6.

Failed on Jamrao for lack of early water supply, *Rahman*, 60000-1.

Mettaffifi and Abbasi, better than American, but given up for lack of early water supply, *Shahani* (204), 60556-9.

showed Promise of success as long as perennial irrigation existed on Jamrao, *Rahman* (145).

now under trial at Sakrand and doing comparatively well, *Rahman*, 60000.

Failure of crop, *Harrison*, 58882-6.

Variety 27 W. N. :

Quality : superior to deshi and is being distributed, *Rahman* (144).

Type : a selected strain from ordinary local cotton, which has four types ; is a white flowered ordinary *neglectum roseum* ; very popular, *Rahman*, 60005.

Fodder : abundant supply from rice cultivation, *Bhutto* (70) ; shortage does not normally exist (71).

Food crops : 81 per cent of total cropped area ; percentage will increase under Baker-Lane Scheme under Lloyd Barrage ; not much cotton cultivation, *Rahman*, 60177-9.

Important crops : in Sind, lists of, *Rahman* (144), *Shahani* (204), cultivation of Juar : should be increased, *Khoso* (167).

Improvement impossible owing to shortage of labour, *Bhutto* (70).

Income per acre from rice about Rs. 40 ; juar Rs. 20 at most, *Bhutto*, 59246-52.

Legumes : hybridisation recommended, *Shahani* (204).

Output : 23 per cent decrease, and distinct decrease in cropped area in Karachi : thought to be due to insufficient water supply, *Rahman*, 60038-40.

PESTS :

Demonstration and propaganda necessary, *Karachi Indian Merchants' Association* (184), 60518.

Expenditure on prevention of may make future remissions of taxation unnecessary, *Karachi Indian Merchants' Association* (184), 60518.

Protective measures have all failed, *Bhutto* (70).

Research necessary, *Bhutto* (65) ; *Karachi Indian Merchants' Association* (184), *Shahani* (204).

Serious, making agriculture precarious, *Karachi Indian Merchants' Association* (184), 60518.

Potato seed imported from Italy, Kalka and Farukhabad ; imported disease has not arisen, *Rahman* (145).

CROPS AND CROP PROTECTION—contd.

RICE :
Consumes ten times as much water as dry crops, *Khoso*, 60224-6.
Cultivation should be restricted as to irrigation, *Khoso* (167).
Enquiry as to outturn advocated, *Shewakram*, 60803-5.
Income about Rs. 40 per acre, *Bhutto*, 59246-52.
Outturn, 10 to 12 maunds per acre in Sind as compared with 30 maunds in Italy and Spain, *Shewakram* (221).
most Profiable crops in view of shortage of labour and its fodder yield ; should be encouraged to the exclusion of all other crops, *Bhutto* (70).
Selection of local and foreign varieties and hybridisation, *Rahman* (144-5).

Seed : increasing economy in use of, *Bhutto* (70).

SEED DISTRIBUTION :
in Bhitshah in Hyderabad cultivators and merchants co-operate to maintain pure cotton seed supply, *Rahman* (145).
should be by Co-operative societies, supply coming from the Agricultural Department, *Hussain* (131-2) ; *Dow* (38), 58940.
Cotton : 27 W. N. and Bhitshah, greatly appreciated, *Azimkhan* (103).
Departmental organisation, though very limited, appears to be on right lines, *Rahman* (145).
Depots should be financed by government and managed by co-operative societies or Government, *Musto* (89).
Difficulty of obtaining good seed ; useless to approach Agricultural Department, *Shahani*, 60606-8.
Free issue, value to be recovered from crop, until good strains are established, *Musto* (89).
Government Stores Department, should be purchased from, *Azimkhan*, 59695-7.
Improved seed : demand for very active at premium of annas 12 to Re. 1 per maund, *Rahman*, 59961-7.
Multiplication : seed grown on department's farm and multiplied by private seed growers under supervision of department ; strain renewed every year by department, *Rahman*, 60051-5.
Quality distributed by bania and mofussil seed merchants poor, *Rahman* (145).
Small holder generally gets his seed from Zamindar ; village shopkeeper not sufficiently educated to be trusted with distribution, *Karachi Indian Merchants' Association*, 60486-94.
Village bania or mofussil merchant generally depended upon, *Rahman* (145).
Wheat : Pusa 12 :
Greatly appreciated, *Azimkhan* (103).
Obtained from Jacobabad Government Farm, *Khoso*, 60187-8.
Seed improvement : by selection, isolation of superior strains and maintenance by pure line culture, *Rahman* (144), 60153-5.

SUGARCANE :
Cultivation of in Deccan not diminished owing to irrigation charges, *Harrison*, 58844-7.
Irrigation water used for might be diverted to other crops, *Harrison*, 58878-86.
Wasteful methods of cultivation, *Harrison*, 58844-7, 58894-901.

WHEAT :
Cultivation, *Khoso*, 60227.
in Deccan might be grown under irrigation instead of sugarcane, *Harrison*, 58846-7.
Improvement of local wheats, *Rahman* (144).
Introduction of Pusa 12 c and Punjab 11, *Rahman* (144).
Pusa 12 being grown on 50,000 acres ; is being extended ; difficulty, lack of steady water supply ; cultivator convinced of benefit, *Rahman*, 60047-50, *Azimkhan* (103) ; *Khoso*, 60187-8.

WILD ANIMALS, DAMAGE BY :
more Gun licenses should be issued to zamindars, *Khoso* (167), 60263-4.
Local authorities giving necessary licenses, *Bhutto* (70).
Pig should be shot, *Shahani* (204).

CULTIVATION :

Bosi system : in Upper Sind Frontier ; land flooded in September and wheat grown without further irrigation ; provides work for 8 to 10 months in the year, *Rahman*, 60121-4.
Dry cultivation (without irrigation) impossible in Sind except desert portion of Thar Parkar and part of Karachi District, *Rahman*, 59911-8.
Interculturing cotton by plough, thus saving labour, *Rahman* (145).
Interference in the existing methods inadvisable, *Bhutto* (70).
Mixture of seeds when sowing not generally adopted in Sind, but mixed juar, bajri, maize and til sprinkled in cotton to supply early fodder for working cattle, *Rahman* (145).
Ploughing, dry, practised in some tracts as a result of departmental demonstration, *Rahman* (145), *Shahani* (200), (204), 60602, 60675.

Rotation :

Correct methods in use, *Bhutto* (70).
Experiments carried on, until Jamrao perennial water supply failed ; being carried out at Sakrand under Barrage conditions, *Rahman*, 60065-6.
not Necessary at present as irrigation facilities only allow one-third of the land to be cultivated per annum ; but under improved irrigation a good rotation must be devised, *Rahman* (145).

DEBT, *see under* **AGRICULTURAL INDEBTEDNESS.**

DECCAN AGRICULTURISTS' RELIEF ACT, *see under* **AGRICULTURAL INDEBTEDNESS.**

DEMONSTRATION AND PROPAGANDA.

Activities of Department should be increased, *Bhutto* (66) ; more funds required, *Bhutto*, 59161-2.
Agriculture Day, All-India, should be observed, *Karachi Indian Merchants' Association* (182).
Central research station should assist provincial research and demonstration, *Harrison* (11), (12), 58782-3.
Cinema and magic lantern advocated, *Karachi Indian Merchants' Association* (182), *Shahani* (200).
Co-operative Department (through taluka development associations) has popularised improved seeds and ploughs, *Hussain* (129).
Co-ordination of Agricultural and Co-operative Departments has been beneficial, *Azimkhan* (103).
Cultivators : are not conservative ; are willing to adopt methods proved to be effective ; importance of sympathy with, *Karachi Indian Merchants' Association* (182).
Cultivators, selected, should be used for, *Shahani* (200), 60603-5.
on Cultivators' Own Fields, recommended : *Harrison* (11-2), 58712-5, 58778-81, 58795-7, *Dow* (36), 58954-6, *Musto* (89), *Azimkhan* (103), 59624-7, (103-4), *Hussain* (129), *Rahman* (141), 59948, 59963, 60153-5, *Karachi Indian Merchants' Association* (181-2), *Shahani* (200), *Shewakram* (221).
by Comparative plots, *Dow* (36), 58954-6, *Azimkhan* (103), 59624-7, *Shewakram* (221).
with Guarantee against loss, *Harrison* (11-2), 58712-5, 58778-81, 58795-7, *Dow* (36), 58954-6.
by Organised bodies of zamindars and cultivators, *Azimkhan* (103), 59624-7.
more Successful than leaflets, pamphlets, etc., *Azimkhan* (103-4).
Daulatpur, reclamation of land a failure in demonstration, *Dow* (36).
Decorations : awarded at district Durbars, *Rahman* (142), should be given to Zamindars, *Khoso* (166).
Demand : for great owing to change of methods, *Mann*, 58644-5.
Demonstrators : defects of, *Shahani* (200), 60673-4.
Departments of Agriculture and Irrigation should work together, *Harrison* (10).

FARMS, departmental :

on the Batai system, the department taking one-third produce on lift irrigation and one-half on flow, *Rahman*, 59959-60.
Cultivation : 400 or 500 acres for multiplying seed ; cultivated by haris on a commercial basis, with no special advantages beyond those arising from better seed and cultivation and advances without interest, *Rahman*, 59947-58.

DEMONSTRATION *and* **PROPAGANDA**—contd.

FARMS, departmental—*contd.*

too Elaborate; should be completely separated from experimental farms, *Harrison* (11).
have not Influenced cultivators much, because not on commercial lines, *Hussain* (129), 59847-53; 59865-6.
Farms, model, advocated, *Karachi Indian Merchants' Association* (182).
Government should give small strips of land to zamindars, *Khoso* (166), to encourage good cultivation, *Khoso*, 60240-1.
Improvements, list of, *Azimkhan* (103).
Indigenous methods should be starting points for gradual improvement, *Harrison* (11), (*See also under* **RESEARCH.**)
Jamesabad and Nawabshah sub-stations, managed on zamindari lines, *Rahman* (142).

Leaflets:

Periodical publication of, advocated, though not very effective among illiterate cultivators, *Rahman* (142).
often Useless, *Harrison* (12).
in Vernacular and popular, advocated, *Karachi Indian Merchants' Association* (182).
Lectures advocated, *Karachi Indian Merchants' Association* (182).
Obstacle: conservatism of cultivators, *Dow*, 58991-2.
Organisation: should be central; Director of Agriculture should have advisory board representing agriculturists, etc., *Karachi Indian Merchants' Association* (182), 60373-4.

Ploughs, improved, in Jamrao area, *Dow* (36).
Pusa wheats introduced in Upper Sind, *Dow*, 58966.
Reclamation of alkali land at Dowlatpur minor, a signal failure, *Shahani* (200).
Research should be separate from, *Harrison* (10), (12).
Shows, agricultural, held, *Rahman* (142), *Shahani* (199-200).

STAFF:

Demonstrator required in every taluka, *Harrison*, 58798-800.
in future will consist, as far as possible, of Sindhi Mussalmans, trained at Poona and Sakrand, *Mann*, 58641-3, 58691-3.
Insufficient, *Harrison* (12), *Rahman* (142), 59947.
Personality, importance of, *Harrison* (12), *Bhutto* (66), *Rahman* (142), 60163-5.
Scholarships for training increased under new development scheme, *Rahman* (142).
Successful measures: example of superior cultivator; breaking land several times; seed selection and distribution, demonstration on cultivators' own fields; bulletins issued by Agricultural Department in the vernacular; exhibitions and shows, *Shahani* (199-200).
Taluka Development Association: should do all demonstration and propaganda and should be subsidised by Government, *Hussain* (129).
Wireless broadcasting should be fully utilised, *Karachi Indian Merchants' Association* (182).

DOW, H., I.C.S., Revenue Officer, Lloyd Barrage and Canals scheme (36-64).

Past appointments and present duties, 58913-6, 59117-8.

ADMINISTRATION:

Co-ordination between Provinces insufficient (36).
Transport:
Railways: feeder, required in Lloyd Barrage area (37); ordinary broad gauge, 58968; Government policy of extension, 58969; on the left bank 3 short lines proposed, 59042-4.
Roads: Board just appointed, 58971, 59077.
Improvement necessary and tolls for, justifiable (37).
Railways, co-ordination with, necessary, 58971-2.

AGRICULTURAL DEPARTMENT:

Daulatpur reclamation scheme, failure of, brought Department into disrepute locally (36).
Staff: insufficient in numbers and quality, 58954-6.

DOW, H—contd.

AGRICULTURAL INDEBTEDNESS :

Causes of borrowing : social customs, capriciousness of inundation, ignorance, priest-craft (37), 59107 ; poverty and prosperity (37).
Co-operation and Legislation like Punjab Alienation Act would tend to reduce uneconomic borrowing (37), 58973, 59096-103.
Lloyd Barrage :
Cost of clearing land would not be very heavy and would not cause indebtedness, 59096-103.
Rise of price of land has increased borrowing ; Barrage will therefore probably increase indebtedness which is not necessarily an evil, 59096-103.
Non-agriculturists, tendency for land to pass into hands of, 59027 ; no classification of agricultural and non-agricultural tribes ; will have to be made, but not necessarily the same classification as in the Punjab, 59045-9.
Repayment prevented by the same factors as cause borrowing (37).
Sources of credit : land and character (37).

AGRICULTURAL INDUSTRIES :

Fruit and vegetable gardens introduced in Jamrao area (36).

AGRICULTURAL LABOUR :

Attracting labour, no measures necessary (38).
Hari has no permanent interest in the land and therefore gravitates to where labour is wanted (38). (*See under* " Haris ".)
Lloyd Barrage : population will be sufficient to cultivate new lands, because : conversion of lift into flow will release cultivators, decrease of idleness, improved methods of organisation, increase of population (39).

CO-OPERATION :

Failure, instance of (39) ;
Joint farming societies : formed by Educated young men would receive sympathetic treatment, 59073-4, 59122-9 Failed in Punjab, 59053 ; Premature (39).
Lloyd Barrage scheme : puchasers of land might be financed by credit societies, 58930-1.
Minorities should certainly be compelled to come into schemes for joint improvement, (39) 59029, 59075, 59130.
Progress : considerable, 58983-5.
Pumping schemes to be run by co-operative societies, 59076.
Punjab consolidation of holdings societies being studied (39), 58974-6, 58982.
Rectangulation of holdings in the Lloyd Barrage area should be done with the assistance of co-operative societies (39).

CROPS AND CROP PROTECTION :

Cotton :
American, long staple, should be concentrated on under Barrage perennial water-supply, *e.g.*, 4 F. ; spread of, checked by unsuitable water conditions (38), and marketing conditions leading to cultivator not getting fair share of higher value, 58977-9.
Deshi, Agricultural Department has attempted to improve in the past, because of unstable water-supply (38).
Seed distribution : should be undertaken by co-operative credit societies (38), in combination with Agricultural Department, 58940.

DEMONSTRATION AND PROPAGANDA :

on Cultivators' own fields, with guarantee against loss ; comparative plots model farms often useless (36), 58954-6.
Obstacles : conservatism of cultivators, 58991-2.
Ploughs, improved, in Jamrao area (36).
Pusa wheats introduced in Upper Sind, 58966.

DOW, H—contd.

EDUCATION :

Agricultural bias advocated (39) ; in all rural schools, 59003, 59030-2, 59081.
Attendance at school depends on boys not being required in the fields, 59004-5.

Books : elementary readers should contain descriptions of matters such as agricultural and Lloyd Barrage (39).
Hindus take to education more than Mussulmans, 59004.
Middle class youths should be attracted to agriculture and start as haris, 59073-4, 59122-9.
Night schools : not suitable for boys, 59006.
Vernacular, education of children is and must be in, 59007.

FERTILISERS :

Animal manure :
Preservation should be more careful, *e.g.*, folding (38).
Supply, very large if properly preserved (38).
Artificial : too expensive (38).
Blood, dried, from slaughter houses : used for fruit trees (38).
Cowdung : nothing can be done to discourage use of as fuel (38) ; alternative fuel supply in Sind, 58941-5, 59116.
Fish : where available used for fruit trees (38).
Goat and sheep dung : richer nitrogenous and phosphoric content recognised for expensive crops : folding advocated (38).
Kallar earth : used as top dressing for cotton, juar and wheat (38).
Night soil and poudrette : near large towns used for garden crops (38).
Value of manure considerably increased recognition of, during last 15 years (38).

Village sites, old, earth collected from, used as top dressing for cotton, juar and wheat (38).

FINANCE :

Lloyd Barrage scheme : purchasers of land might be financed by co-operative credit societies ; no special machinery proposed, 58930-1.
Fodder, cost of growing natural grass with canal water, 58946.

FORESTS :

Firewood : 58941-5 ; scrub jungle and forests near river, 59116.
Lloyd Barrage scheme : reduced assessments on plantations, 58941-5.

HARIS :

Freeholders, haris should be established as, 59068-70, 59108-12.
Outturn : both cultivator and zamindar have an interest in increasing, 59023.
has no Right in the soil ; generally on flow land zamindar takes half and on lift land one-third, 58998-9002, 59021-2.
Zamindar does not usually help the hari in cultivation, 59067.

HOLDINGS :

Consolidation :
Area, holdings, too small, should not be recognised by courts, Government or Irrigation Department, 59130.
Co-operative societies for consolidation in the Punjab being investigated (37), 58974-6, 58982.
Distribution of produce : zamindar takes half on flow land and one-third on lift land, 58998-9.
Fragmentation : not very serious ; rectangulation desirable (37) ; Revenue Department should do this work, 58974-6.
Rivers : loss of holdings through change of course, 58993-7.
Size : over 500 acres less than 2,000 ; 75 per cent under 25 acres ; average size 36 acres ; 7 per cent over 100 acres, 58924-7

DOW, H.—contd.

IMPLEMENTS :

Ploughs, improved, successfully introduced in Jamrao area (36).

IRRIGATION :

Cotton : American, cultivation of, restricted in the past by unstable water supply (38).
Hakabo : water rate charged to jagirdars who do not pay land revenue : no obligation ever undertaken by Government to spend on silt clearance, 59131-2.
Lift, by pumping, of great importance ; should be investigated (37-8), 59028 ; might be done by co-operative societies, 59076 ; cattle would be released for field work (38).
Silt clearance, often not necessary, 59131-2.

LAND TENURE :

Peasant tenantship, such as exists in Sudan, should be considered, 59071.

LLOYD BARRAGE :

Afforestation : fuel problem not so acute as elsewhere ; exemption and decrease of assessment permitted as to babul groves, 58941-5.
Assessment rates : 59082-3.
Colonisation scheme :
Area : Government land available about 1¼ million acres, practically all virgin land ; total area commanded 8 million acres ; cultivated area will be 6 million acres, 59054-7.
Auction of land not advisable till 2 years before flow irrigation commences, 58919-20, 58928-9.
Cost : 18 crores, 59057.
Finance of purchasers might be by co-operative societies ; no *ad hoc* machinery for financing suggested, 58930-1, 59059-64.
not yet Formulated, 58917.
Holdings : at present 75 per cent under 25 acres, 36 acres being average size, 58924-7.
Indebtedness : rise in price of land owing to Barrage may increase indebtedness ; land would be sold by auction free of restriction ; cost of clearing will not be heavy and will not lead to indebtedness, 59096-103.
Jungle land might be leased for clearing, 59065-6.
Large estates, policy as to formation of not decided upon ; Punjab experience against, 58932-35 ; lease to company, as in the Sudan, might be considered, 59071.
Leasing : land not considered ripe for sale should be leased, 58932-3.
Non-agriculturists, no feeling against, 59072.
Policy of Government should be published for public criticism, 59033-5.
Price : land should not be sold until a proper price can be obtained, 59050-2.
Punjabis, percentage in Sind small but growing ; realise value of land under perennial irrigation more than the Sindhis do ; should not be excluded, 59036-8, 59113-4 ; Punjabis, being more affluent, have probably contributed more of the capital borrowed from the Government of India for the Barrage, 59039-41.
Restrictions as to methods of tillage, improved varieties of seed, etc., not advisable as impossible to enforce ; experience on the Jamrao Canal, 58936-40.
Small-holders should be encouraged, 58923-24 ; example of Bikaner ; small-holder willing to pay proper price, 59058-9.
Temporary leases, concessions will have to be made in respect of, 58921-2.
Date of commencement of water flow : March 1931, 58918-9.
Drainage : adequate, 58953.
Popularity of scheme, 58989-90.
Railways, feeder, required (37).

MARKETING :

Cotton : American, spread of restricted in the past by bad marketing conditions, 58977-9.

DOW, H.—concld.

MOHAG : (frontage) :

Fallow forfeited land included in zamindar's existing mohag, 59024.
Meaning of : claim to land in the frontage of a zamindar which cannot be granted to another zamindar without injuring the former's rights of user or access to his existing holding ; never claimed or recognised as a legal right ; founded on conditions attaching to inundation irrigation, 58947-50.
Provision for : Government in Lloyd Barrage scheme setting aside 3½ lakhs of acres representing 25 per cent of the total Government land available, 59024, 59079-80.

necessary to Recognise the claim to some extent under the Lloyd Barrage, 58951-52.

RESEARCH :

Lift irrigation, by pumping, should be investigated (37-8).
Mirpurkhas experiment with Egyptian cotton, a failure mainly because of defective marketing, 59008-9.
Sakrand Research Station :
Control should be by an officer permanently in Sind and not from Poona, 58957.
Finance : cost being met from current revenues and not from Lloyd Barrage loan, though the station is not revenue-producing, 59119-21, 59014.
Kallar : experiments to be conducted under Barrage conditions, 59010-1.
Progress : at work nearly 2 years ; in a position to give a great deal of useful advice; results of experiments will apply to right bank area except central rice canal, 59015-20.
Propaganda, now more important than research as to best varieties, 59012.
Soil deterioration due to irrigation, study of, not far advanced, 58960.
Sufficient probably for general purposes, 58958-9.

SOILS :

Daulatpur reclamation scheme, failure of (36).
Deterioration as a consequence of irrigation : importance and urgency of research, 58960-93.

STATISTICS :

Crop yield : figures unreliable ; method of collection must be revised ; indirect method of collection quite unreliable (40), 58986-8.
Livestock and implements : figures suspected to be quite unreliable : concentration of effort over a limited area suggested (40) ; figures collected every 5 years ; staff ill-paid and heavily worked, 59084-95.

TALUKA DEVELOPMENT ASSOCIATIONS :

Finance : need more funds, (36) ; Government will have to supply funds, 59025-6.

Progress : capable of doing good work, danger of falling into bad hands (36), 58964-5.

VETERINARY :

Service in Sind so small that its effect is hardly discernible (37).

WELFARE OF RURAL POPULATION :

Surveys, economic, in typical villages : most valuable but liable to be biassed and Government cannot afford to undertake the work (39-40).

DRAINAGE, *see under* **SOILS.**

EDUCATION :

Account-keeping, importance of teaching, *Rahman* (140).

ADMINISTRATION :

of Agricultural education should be by Agricultural Department, *Shahani* (199).
of Educational schemes : could be through zamindars with Government financial help, *Khoso* (166).

EDUCATION—contd.

ADULT :

could be Done through zamindars with Government financial help, *Khoso* (166).
can be Popularised by being free, *Shahani* (199).

AGRICULTURAL :

Attendance :
(*See also* " Attendance at School " below).
school Hours should be in the afternoon and from 8 to 10 o'clock at night, *Shewakram* (221).
Insufficient, due to : disappointment in not obtaining Government appointments, distance of Poona Agricultural College ; training not sufficiently practical ; insufficient scholarships ; not properly graded, *Shahani* (198).
lack of Interest of parents due to labour of children being required, *Shewakram* (221).
Number of boys should be increased, *Khoso* (166).
very sparse in several areas, *Shewakram* (221).
boys Work from 7 to 8 a.m. to 11 or 12 ; go out to work again at 4 or 5 p.m., *Shewakram*, 60735-41, 60845.
Bias :
Advocated, *Dow* (39) ; in all rural schools, *Dow*, 59003, 59030-2, 59081.
All education should have, *Karachi Indian Merchants' Association* (181).
Bias schools :
Agriculture only taught in higher standards, boys aged 13 to 18, *Rahman*, 59933-5.

Control : local boards have administrative control, but agricultural department lays out farms and visits in an advisory capacity, *Rahman*, 59929-31.
few sons of Cultivators ; boys have no idea of taking up agriculture, *Rahman*, 59936-8.
Farm of about an acre attached to each : some buy or hire bullocks ; 3 agricultural lessons of 1½ hours each per week, *Rahman*, 59939-41 : in Jacobabad ; farms attached ; good, *Khoso* 60273-7.
Number : six in an experimental stage, *Rahman* (139), (148).
not working Satisfactorily because not the right type of boy, mainly sons of landless haris, *Rahman* (139-40), 59942, 60151-2.
Schoolmasters trained for 6 months at Lyallpur, *Rahman*, 59931.
Careers of students :
Cultivation of their own lands rarely, *Shahani* (199).
Disappointing, *Bhutto* (66).
Government service, *Rahman* (139-40), *Shahani* (199).
College for Sind :
Agricultural would be preferable to Arts College, *Karachi Indian Merchants' Association*, 60434, not necessary, *Rahman*, 60071-5, 60105-8.
in Barrage area recommended, *Mann*, 58700-7.
Demand for, *Mann*, 58643, 58700-7, *Rahman*, 60071-5, 60105-8, *Karachi Indian Merchants' Association* (182), 60375-8, 60434, *Shahani*, 60542-5, 60727-8.
at Research Station recommended, *Karachi Indian Merchants' Association* (182).
should be Compulsory for all schools, *Bhutto* (66), 59156-9.
Curricula : agriculture should be an optional subject in Intermediate science and arts degrees ; greater stress should be laid on agricultural practice, *Shahani* (199) 60581-3 ; should be taught in all primary classes, *Shewakram* (221) 60778-83.
Demand, may be stimulated by : demonstration that scientific agriculture is more paying ; revision of ideals ; reservation of tahsildarships for agriculturally trained applicants ; grants of land to educated agricultural communities ; scholarships, etc., *Shahani* (198).
Facilities, teaching, very necessary to extend, *Bhutto* (66), *Khoso* (166), *Shahani* (198), *Shewakram* (221).
Farms should be attached to rural schools, *Bhutto* (66), (73), *Khoso* (166), 60241.
Finance : additional land revenue of 1 anna in the rupee, earmarked for agricultural education, advocated, *Shewakram* (221).
High schools, in Lower and Upper Sind, with a 4 years' course, necessary, *Karachi Indian Merchants' Association* (182) ; demand will arise under Lloyd Barrage conditions, *Karachi Indian Merchants' Association*, 60422-4.
Land should be given to students on leaving school, *Bhutto* (66).

EDUCATION—contd.

AGRICULTURAL—*contd.*

MIRPURKHAS AGRICULTURAL SCHOOL :

Boys were from 12 to 15 years of age, *Rahman*, 59919-21.
Closed 10 years after opening owing to non-attendance of students due to failure to secure jobs, *Rahman* (139).
Cost Rs. 18 to Rs. 20 per boy per month per term, *Rahman*, 59922-5.
not sons of Cultivators, *Rahman*, 59926-7.
Defect in recruitment of boys, not in teaching, *Rahman*, 60032-3, 60151-2.
English not taught, *Rahman*, 59928; might be provided as an attraction, *Rahman*. 60036-7, 60151-2.
Failed because it was carried on under artificial conditions and owing to unreasonable attitude of zamindars, which has changed, *Karachi Indian Merchants' Association*, 60379-81.
Opened in 1912, *Rahman* (139).
Qualification for admittance : vernacular 4th or 5th standard, *Rahman*, 60034-5.
Poona agricultural college, too distant and course too theoretical, *Karachi Indian Merchants' Association*, 60495-508.
Practical experience necessary, *Khoso* (166).
Primary Schools :
Boys would attend between the ages of 7 and 10, *Karachi Indian Merchants' Association*, 60474-7.
Curriculum : reading, writing and arithmetic should also be taught, *Karachi Indian Merchants' Association*, 60352-3, 60435-6.
with Farms attached ; would prevent migration to towns, *Karachi Indian Merchants' Association* (181-2).
Requirements : at least one at headquarters of every division and centre of large group of villages, *Karachi Indian Merchants' Association* (182).
Rewards (employment or land) should be given to students after finishing course, *Khoso* (166) 60241.
Scheme for an agricultural school, *Rahman* (140-1), 59988-9, 59992-7, 60036-7, 60075-6, 60149-50.
Scholarships for boys advocated, *Shewakram* (221).

SCHOOL FARMS :

Advocated, Experimental, should be, *Shahani* (199) ; Necessary, *Khoso* (166).
School plots : necessary, *Khoso* (166), *Shahani* (199).
Students, drawn mainly from agricultural classes, *Khoso* (166), few sons of cultivators, *Rahman*, 59936-8 (139-40).
Subsidiary industries hampered by lack of, *Shahani* (205).
Teachers :
should be Drawn from agricultural classes, *Bhutto* (66), *Khoso* (166), *Shahani* (198), *Shewakram* (221).
Supply insufficient, *Khoso* (166), *Shewakram* (221).

Agricultural Day : should be observed, *Karachi Indian Merchants' Association* (182).
Agricultural efficiency not improved by, *Hussain* (133).

ATTENDANCE AT SCHOOL :

(*See also* "Attendance" *under* "AGRICULTURAL" above.)
Afternoon, recommended, *Karachi Indian Merchants' Association* (182), *Shewakram* (221).
Depends on boys not being required in the fields, *Dow*, 59004-5.
in 4th class poor owing to boys having to work, *Hussain* (133).
Limited by work in the fields and religious instruction, *Bhutto* (73).
should be in Non-crop season, *Karachi Indian Merchants' Association* (182).

BOOKS :

Elementary readers should contain descriptions of matters such as agricultural and Lloyd Barrage, *Dow* (39).
Revision required, *Harrison* (15).
Cinema : advocated, *Shahani* (199).
Committee of 1920 : Report, *Rahman* (140-1).

EDUCATION—concld.

COMPULSORY PRIMARY EDUCATION :

Advocated, to protect cultivators from extortion of moneylenders, *Rahman* (143), 60134-6.
Coercion would cause education to become unpopular, *Harrison* (15).
being Introduced but difficulties of scarcity of labour and lack of appreciation, *Bhutto* (73).
District local boards, should control schools, *Bhutto* (66).

English : should be taught ; boys cannot be kept on the land by refusing to teach them English, *Rahman*, 59944-6.
Finance : by Local Governments with compulsory cesses levied on large landholders, *Shahani* (199), 60670-2.
Haris : little use in establishing agricultural schools for sons of, *Rahman* (140-1) ; should not be admitted to zamindari schools, *Rahman*, 60149-50.
Hindus take to education more than Mussulmans, *Dow*, 59004.
Indebtedness :
Caused by lack of, *Shahani* (202).
might be Relieved by, *Karachi Indian Merchants' Association* (183).
Intermediate Agricultural Colleges, advocated ; to teach agriculture, rural economics, agricultural chemistry, etc., *Shahani*, 60542-5 ; at Karachi, Nawabshah and Sukkur, 60727-8.
Moral training essential, *Shahani*, 60363.
Nature study recommended, *Khoso* (166), *Shahani* (199), *Karachi Indian Merchants' Association*, 60354.
Night schools, not suitable for boys, *Dow*, 59006.
Rural, should not aim as high as at present, *Harrison* (15), 58753-5.
Schools, methods are too dull, *Karachi Indian Merchants' Association* (182).
Sind D. J. College : no agricultural teaching, *Shahani*, 60542, 60665-7.
Technical knowledge, very few movements for improving, *Shahani* (199).
Vernacular, education of children is and must be in, *Dow*, 59007.
Vocational training of children, advocated, *Karachi Indian Merchants' Association*, 60352-64.
Wireless, broadcasting should be fully utilised, *Karachi Indian Merchants' Association* (182).

ENCUMBERED ESTATES ACT, *see under* **AGRICULTURAL INDEBTEDNESS.**

EROSION, *see under* **SOILS.**

FERTILISERS.

Adulteration : sale should be under guaranteed Government analysis, *Shahani* (204).

Animal manure :

Preservation should be more careful, *e.g.*, folding, *Dow* (38).
Supply, very large if properly preserved, *Dow* (38).

ARTIFICIAL :

too Expensive, *Dow* (38).
less Profitable than natural manure, *Khoso* (167), *Shahani* (203).
for Wheat, sugarcane, etc., distributed through a private firm and co-operative societies, *Rahman*, 60156-62.
Blood, dried, from slaughter houses, used for fruit trees, *Dow* (38).
Bones should be preserved, *Shahani* (203).

COWDUNG, use of, as fuel :

Alternative fuel supply in Sind, *Dow*, 58941-5, 59116.
not a Common practice, *Rahman* (144).
might be Discouraged by relaxing forest rules and so cheapening firewood, *Shahani* (204).
Due to lack of other fuel, *Bhutto* (70).
Forest areas, not practised in, *Aitchison*, 60314-20.

FERTILISERS—contd.

COWDUNG, use of, as fuel—*contd.*

Legal prohibition not desirable, *Shahani* (204).
Legislation advocated to prevent cowd ng being taken to towns and sold, *Rahman* (144).
Nothing can be done to discourage use of as fuel, *Dow* (38).
Penalisation of, recommended, *Kaoso* (167) 60201-2.
Experiments on land of cultivators recommended, *Shahani* (204).
Fallow system, taking a crop every 3 years, has obviated great use of manure, *Rahman* (144).
Fish where available used for fruit trees, *Dow* (38).
Freights should be reduced, *Shahani* (204).
Goat and sheep dung: richer nitrogenous and phosphoric content recognised for expensive crops; folding advocated, *Dow* (38).
Grants should be made by Agricultural Department to manufacturers, *Shahani* (204).
Green manure, in Sind should be used extensively, *Harrison* (14-5).
Kalar earth: used as top dressing for cotton, juar and wheat, *Dow* (38), *Rahman* (144).
Need of, only with intensive cultivation, *Rahman* (144); under irrigation, *Rahman*, 60156-62.
Night soil and poudrette: near large towns used for garden crops, *Dow* (38).
Oil-cakes should be preserved, *Shahani* (203).
Research insufficient as to phosphates, nitrates, sulphate of ammonia and potash manures, *Shahani* (204).
Silt from canal banks applied to cotton fields, *Rahman* (144), *Harrison*, 58910-2.
Value of manure, considerably increased recognition of, during last 15 years, *Dow* (38).
Village sites, old, earth collected from, used as top dressing for cotton, juar and wheat, *Dow* (38), *Rahman* (144).

FINANCE.

Failure of agricultural finance owing to agriculture being unprofitable, *Bhutto* (67).

IMPROVEMENT OF LAND:

discouraged by want of Capital, *Rahman* (149).
Long term credit at low interest necessary, *Rahman* (149).

LAND MORTGAGE BANKS:

Advocated, *Shewakram* (222).
would not lead to Extravagance, which is not a fault of zamindars, *Shewakram*, 60846, 60872-3.
Interest should be not more than 6 per cent per annum, *Shewakram* (222).
for Long term credit, *Hussain* (129), *Shahani* (201).
Objects: for loan redemption and to finance big schemes of land improvement, *Azimkhan* (104).
at least One in each district, for long term credit, *Shahani* (201).
should be Organised, with power to issue debentures, *Azimkhan* (104).
should facilitate redemption of mortgages, *Hussain* (131).
should be established without Waiting to see whether experiments in other parts of the Presidency are successful, *Azimkhan*, 59666-8.

Lloyd Barrage scheme: purchasers of land might be financed by co-operative credit societies; no special machinery proposed, *Dow*, 58930-1.

LONG TERM LOANS:

Demand for, not very great; about 10 years; maximum of Rs. 10,000 to Rs. 20,000 lent by co-operative societies; to redeem mortgaged property, *Bhutto*, 59182-7.
Land mortgage banks seem to be the only solution, *Hussain* (129).
would not be Wasted, *Bhutto*, 59291-2.
Seed might be issued free of cost till harvest, *Musto* (89).

Short term: sufficiently well catered for by co-operative societies, *Hussain* (129).

FINANCE—contd.

TACCAVI :

Administration : should only be given for land improvement schemes through co-operative societies where such exist, *Azimkhan* (104).
Amount should be increased, *Khoso* (166), *Azimkhan*, 59669-73 ; *Shewakram* (222).
Cultivators would be induced to make fuller use of by : reducing interest to that paid by Government to public *plus* cost of establishment ; fully meeting demands of cultivators ; distribution by senior and vigilant officers, *Rahman* (143) 60137.
Defects : at present amounts inadequate and not given at proper time of the year, *Azimkhan*, 59669-73.
Exactions of subordinates, *Shewakram* (222), *Bhutto* (67-8) 59299-300.
Formalities too great, *Hussain* (129), Shahani (201).
to Haris, *see under* **LAND TENURE.**
Interest too high, *Bhutto* (67-8) 59299-300, *Rahman* (143) 60137.
In Jamrao tract implements advanced as taccavi, *Rahman* (141).
Panchayats in villages should assist, *Shahani* (201).
Promptness, greater, necessary, *Hussain* (129).
Repayment, period of, should be increased, *Khoso* (166), *Shewakram* (222), *Bhutto* (67-8) 59299-300.

FODDER, *see under* **ANIMAL HUSBANDRY** and **FORESTS.**

FORESTS (*see also under* **AITCHISON, P. E.**).

AFFORESTATION :

Opening for schemes probably in the neighbourhood of villages, *Musto* (93).
near Villages, no space for, *Bhutto* (72).

Destruction of, has caused great loss of fuel and grass, *Khoso* (168).

DISTRICT LOCAL BOARDS :

should Control forests, *Bhutto* (72).
would give greater Grazing facilities, *Bhutto*, 59290.

FIREWOOD :

Canals, growing of trees on banks of, and karias, recommended, *Karachi Indian Merchants' Association* (184).
Co-operatively, not grown, *Azimkhan*, 59529.
Encouragement of, 58941-5.
Huris, recommended, *Karachi Indian Merchants' Association* (184) (*see below*).
Loss of, owing to destruction of forests in Jacobabad, *Khoso* (168), 60201-2.
Price would be decreased by light railways in forests, *Karachi Indian Merchants' Association*, 60449.
Production should be encouraged by remission of assessment, *Musto* (93).
Supply of near River, *Dow*, 59116.
Supply of, *Bhutto*, 59144-8.

Fodder : scarcity of, in Jacobabad because there are no forests, *Khoso*, 60200.

GRAZING :

Corruption in lower ranks of department, *Karachi Indian Merchants' Association*, 60448-50, *Bhutto* (72).
Facilities, inadequate, *Bhutto* (72).
Fees :
Heavy, *Karachi Indian Merchants' Association*, 60448-50.
Reduction recommended, *Khoso* (168), 60265-6.
Grounds should be attached to every village, *Karachi Indian Merchants' Association*, 60519-22.
Restrictions, undue, *Karachi Indian Merchants' Association*, 60448-50.
in every Taluka, forests necessary for grazing, *Khoso* (167).

FORESTS—contd.

HURIS :

Advocated for fodder and fuel, *Karachi Indian Merchants' Association* (184).
small huris should be Revenue free, *Karachi Indian Merchants' Association*, 60519-23.
Irrigation : water supply should be increased as meadows in, are insufficient, *Khoso* (168).
Lloyd Barrage scheme : reduced assessments on plantations, *Dow*, 58941-5.
Object : to supply fuel for towns and not to help agriculturists, *Bhutto* (72).
Prices for grass from forests too high, *Bhutto* (72).
Research necessary to discover some plant of rapid growth useful as a crop, hedge and fuel, *Karachi Indian Merchants' Association* (184).
Village forests advocated, *Khoso* (168).
Village plots should exist for supplying grass and firewood, *Bhutto* (72).

FRUIT, *see under* **AGRICULTURAL INDUSTRIES.**

GHI, *see under* **AGRICULTURAL INDUSTRIES.**

GRAZING, *see under* **ANIMAL HUSBANDRY AND FORESTS.**

HARIS, *see under* **LAND TENURE.**

HARRISON, C. S. C., Chief Engineer, Lloyd Barrage and Canals Construction, Karachi (10-35).
Past appointments, 58709-11.

ADMINISTRATION :

Transport :
Carts, in Sind inferior to those of Punjab and Gujerat, 58756-66 (35).
Railways : feeder lines required ; break of gauge nuisance (12).
Roads : Feeder :
Absolute Absence of in Sind ; more important to agriculture than trunk roads (13).
Irrigation Department, should be under Roads and Buildings Branch of Public Works Department, 58850-3.

AGRICULTURAL DEPARTMENT :

Irrigation Department and Agricultural Department should work together (10) ; should be under the same Minister, 58848-9.
Services : satisfactory, 58907-8.
Staff :
Demonstrator required in every taluka, 58798-800.
Insufficient (12).
Personality of officers of paramount importance (12) 58908-9.

CROPS AND CROP PROTECTION :

Cotton : in Deccan might be grown under irrigation instead of sugarcane, 58846-7.
Failure of unirrigated crop, 58882-6.
Sugarcane :
Cultivation of, in Deccan not diminished owing to irrigation charges, 58844-7.
Irrigation water might be diverted to other crops, 58878-86.
Wasteful methods of cultivation, 58844-7, 58894-901.
Wheat : might be grown in Deccan under irrigation instead of sugarcane, 58846-7.

DEMONSTRATION AND PROPAGANDA :

Central research station should assist provincial research and demonstration (11) (12) 58782-3.
On cultivators' own fields, any loss being borne by Agricultural Department (11-2) ; to remove suspicion of cultivators, 58712-5, 58778-81, 58795-7.
Departments of Agriculture and Irrigation should work together (10).
Farms : too elaborate ; should be completely separated from experimental farms (11).
Indigenous methods should be starting points for gradual improvement (11).
Pamphlets : often useless (12).

HARRISON, C. S. C.—contd.

DEMONSTRATION AND PROPAGANDA—*contd.*

Personality of officers of paramount importance (12).
Research should be separate from (10), (12).
Staff : insufficient (12) ; demonstrator required in every taluka, 58798-800.

EDUCATION :

Books : revision required (15).
Coercion : would cause education to become unpopular (15).
Rural : should not aim so high as at present (15), 58753-5.

FERTILISERS :

Green manure : in Sind should be used extensively (14-5).
Silt : 58910-2.

HOLDINGS :

Area : Minimum area for irrigation in future should be fixed : in Deccan 5 acres, in Sind 16 acres (13) 58793-4 ; 16 to 24 acres sufficient in Sind under perennial, irrigation, 58801-2 ; existing uneconomic holdings must be recognised, 58831-7, 58840-3, 58887-9.

IRRIGATION :

Deccan :
Problem of making irrigation pay (13) ; irrigation charges do not affect extent of cultivation of sugarcane ; alternative crops, 58844-7 ; insurance cess proposed, 58878-86.
Wasteful methods of cultivating sugarcane, 58894-6.
Distribution :
Landholders should not control, 58863-4.
Module, proportionate, for all canal water (13).
Volumetric system, practical method should be evolved (13).
Drainage :
removal of choking Aquatic growth by dragline excavators mounted on caterpillars (14) 58746-50.
Drains to be started in first year of giving water, 58737-44.
Flow into Indus, 58890-3.
Importance of, with perennial irrigation of Lloyd Barrage (14).
Ghotki area : will require development during next decade (13) 58723-6.
Hydraulic problems immediately connected with agriculture could be studied at central All-India research station (12).
Inglis : agrees with written evidence of (10).
Inspector General of Irrigation :
such a Co-ordinating authority required, 58782-7.
Post should not have been abolished ; should be advisory with no executive authority, 58902-5.
Jamrao Canal : will be perennial on completion of Lloyd Barrage, 58824-7.
Karia : a water channel leading to zamindar's field from the main channel, 58873.
Lift :
Importance of lift systems in Sind (13).
Low lift, high duty, pumps, possibilities of, should be investigated, 58735, 58829-30.
Pumping difficulties on the Indus, 58727-35.
Local considerations have been given too much prominence (10).
Lloyd Barrage :
Area irrigated, 6 million acres ; area commanded 8 million acres, 58861-2.
Capital cost : Rs. 30 per acre irrigated, 58790.
Drainage channels (*see under* Drainage).
Rectangulation of land necessary (14) 58788-90.
Marani project : practically complete, 58869-71.
Mula scheme : should be taken up (13).
Non-Barrage area :
Effect of Barrage on, exaggerated, 58810-1, 58865-8.
Improvements, great scope for (13), 58824 ; by inundation, subsequently converted to perennial by a weir, 58723-6, 58869-71.

HARRISON, C. S. C.—concld.

IRRIGATION—*contd.*

Plots : sub-division of holdings into, by bunds, necessary for even and economical use of water (14).

Revenue, land : percentage spent on maintenance of canals, 58875-7.

Silt :

Clearance of canals of silt, often useless, 58828 ; percentage of revenue should not be earmarked for this purpose, 58858-60, 58875-7.

Fertiliser, use of as, 58910-2.

Grading of canals to cause formation of berms (14) 58736.

Sugarcane, under irrigation : *See under* CROPS.

Wells : not much scope for in non-barrage tracts of Sind, 58822-3.

MOHAG : an indefinite right to adjacent land ; has now become a nuisance, 58791-2.

RESEARCH :

Central station :

Control should not be by Provinces, 58817-8.

Financed from central funds, 58819-20, 58854-7.

Fundamental research, 58812-5.

Scope : to assist provincial research and demonstration (11-2) ; and for irrigation research, 58716-22, 58854-7, 58782-3.

Demonstration should be separate from research (10) (12).

Departments of Agriculture and Irrigation should work together (10) (12).

Indigenous methods should be studied ; should be starting points for gradual improvement (10).

Provincial stations : Bombay Presidency, two required : Deccan and Sind (12) 58771-3, 58812 ; would investigate local problems, 58812.

Sakrand Experimental Station : 58767-70, 58807-9, 58821 ; all the work being done by Agricultural Department, 58838-9 ; should be entirely separate from Poona, 58906.

Sind : peculiar conditions : separate research station required (12) 58906.

SOILS :

Alkali land : reclamation by leaching, growing hardy crops such as red rice and babul (14) 58751-2, 58772-7.

Drainage : Importance of, in Sind (14), 58737-45.

Removal of choking aquatic growth by dragline excavators mounted on caterpillars (14), 58746-50.

Erosion : not generally serious in Sind (15).

Green mulches : extensive use of, advocated (14).

VETERINARY :

Superior establishment, more required (12).

WATERLOGGING : largely due to methods of cultivation (14) 58803-6.

HEALTH, *see under* **WELFARE OF RURAL POPULATION.**

HOLDINGS.

CONSOLIDATION :

Co-operative effort recommended, *Karachi Indian Merchants' Association* (183), *Musto* (94).

Co-operative societies for consolidation in the Punjab being investigated, *Dow* (37) 58974-6, 58982.

Existing uneconomic holdings must be recognised, *Harrison*, 58831-7, 58840-3, 58887-9.

Fragmented Holdings Bill, *Bhutto*, 59298.

Legislation recommended, *Bhutto* (68) 59222-4, 59298, *Karachi Indian Merchants' Association* (183) 60455-7.

Minimum area should be prescribed, *Harrison* (13) 58793-4, 58801-2, *Rahman* (143), *Karachi Indian Merchants' Association* (183) 60455-7, *Shahani* (202).

Obstacles, *Shahani* (202-3).

Recognition of unduly small holdings should be refused by Courts, Government and Irrigation Department, *Dow* 59130, *Harrison*, 58831-7, 58840-3, 58887-9.

State purchase system, suggested, *Musto* (89-90).

HOLDINGS—contd.

FRAGMENTATION :

Extent of : Evil more serious in Deccan than in Sind, *Musto*, 59398-9 ; not very serious, *Dow* (37).
Importance of preventing, *Karachi Indian Merchants' Association* (183).
Inheritance law mainly responsible for, *Bhutto* (68), *Rahman* (143), *Khoso* (167).
Rectangulation desirable (*Dow*) (37) ; Revenue Department should do this work, *Dow*, 58974-6.

Large holdings : should not be permitted to be excessively large, *Shahani*, 60762-3, *Karachi Indian Merchants' Association*, 60455-7.

Legislation to deal with minors, widows, etc., present law inadequate ; zamindars should be attached to Courts to give advice, *Khoso* (167) ; *Shahani* (202).

Size : over 500 acres less than 2,000 ; 75 per cent under 25 acres ; average size 36 acres ; 7 per cent. over 100 acres, *Dow*, 58924-7.

HAKABO (water rate), *see under* **IRRIGATION.**

HURIS (privately owned woods), *see under* **FORESTS.**

HUSSAIN, KHAN BAHADUR NABI BAKSH MAHAMMAD, M.A., LL.B., Manager, Encumbered Estates in Sind (129-38).

ADMINISTRATION :

Posts and Telegraphs, greater expansion required (129).
Transport :
Railways, feeder, required (129).
Roads : bad ; better main and arterial roads required (129).

AGRICULTURAL DEPARTMENT :

Unsatisfactory (129) ; a very good department ; is gradually improving, 59847-51.

AGRICULTURAL INDEBTEDNESS :

Causes of borrowing :
Capricious inundation, illiteracy, unbusinesslike habits, ceremonies (129), 59876-7 ; selling produce to pay assessment (129), (132) ; high prices of seeds (129).

Deccan Agriculturists' Relief Act : has afforded some relief (130) ; has functioned but not successfully, 59875 ; administration at fault, 59878-81.

Encumbered Estates Act :
Applications by debtors, 59833-5, restricted to landowners who pay more than Rs. 300 annual assessment, 59854-5.
Cultivation : no control over lessee's method but wilful deterioration guarded against, 59841-46, 59871.
Extent of activities : 1,200 estates have come under department, *i.e.*, almost all the big landholders, 59860-4.
Income : 7 per cent management charges, one-third of remainder to debtor for his maintenance, remainder of income devoted to liquidating debts, 59836.
Interest reduced in the first year from 10 to 4 lakhs, 59859.
estates Leased by public auction, 59839.
Loans : department does not lend money, 59853.
Management, financial 59856-8.
Minors, Commissioner decides upon motion of Collector or relations, 59836-7.
Procedure : manager deals with claims as a court of equity, 59838.
some Relief has been given (130).
Usurious Loans Act, comparison with, 59867-9.

Extravagance, only true of 10 per cent of the zamindars (130) 59876-7.

Measures for lightening agriculture's burden of debt : restricting interest, making usury in extreme cases a criminal offence (130-1) 59870 ; compelling keeping of proper books of account ; Punjab Restriction of Alienation Act ; supplying credit facilities ; purchase and sale societies ; Usurious Loans Act of 1918 and English Moneylenders' Act of 1900 should be applied throughout India (130-1) ; special courts of equity should be set up, 59882-97.

Moneylenders :
British judicial system favourable to moneylender at ruinous cost of cultivators (130).

HUSSAIN, K. B. NABI BAKSH MAHAMMAD—contd.

AGRICULTURAL INDEBTEDNESS—*contd.*

Moneylenders—*contd.*
Exploit cultivators mercilessly (130).
Profiteer as middlemen (131) 59872-74.
Moneylenders Act (English) of 1918 : some provisions of, should be applied to India (131).
Mortgages : non-terminable, must be prohibited (131).
Repayment prevented by : bad seasons, lack of method in liquidating debts, high interest, dishonesty of moneylenders (130).
Sources of credit : bania only principal source (130).
Usurious Loans Act : should be made applicable throughout India (131) 59867-9.

AGRICULTURAL INDUSTRIES :

Bee-keeping : unknown (132).
Employment, rural, might be increased by stimulating subsidiary industries (132).
Fruit-growing : impossible for lack of irrigation during 8 month (132).
Health conditions of villages, devotion of spare time to : should be encouraged by propaganda (132).
Industrial concerns moving into rural areas : of doubtful effect owing to small number (132).
Lac-culture : possible to a limited extent (132).
Leisure period : Cultivator works 180 days on his holding ; during the rest of the year he is idle or carting, cutting and selling fuel or working in the towns (132).
Obstacles : lack of initiative and money (132).
Pisciculture : out of the question owing to abundance of fish everywhere (132).
Poultry breeding : might be successful ; Government might encourage ; already pursued but spasmodically and not scientifically (132).
Preparation of agricultural produce for market, industries connected with, should be encouraged (132).
Rope-making : done to some extent (132).
Sericulture : impossible owing to climate (132).
Study, intensive, of each rural industry, recommended (132).
Weaving : might be successful ; Government classes suggested (132).

CO-OPERATION :

Credit societies : necessary to save cultivators from merciless exploitation of banias (131) ; are doing very well (133).
Government : should confine its activities to propaganda, organisation, finance and audit (132).
Non-official should encourage co-operation by propaganda and education (133).
Progress : has made an important contribution to welfare, 59828-30.
Purchase societies : necessary, to save cultivators from clutches of banias who sell at exorbitant prices (131).
Sale societies : necessary, to save cultivators from clutches of banias who buy at very low prices and cheat in weighment (131-3).
Seed supply societies, necessary (131-2).
Zamindars, big, not yet affected by, 59830.

CROPS AND CROP PROTECTION :

Seed distribution : should be by co-operative societies, supply coming from the Agricultural Department (131-2).

DEMONSTRATION AND PROPAGANDA :

Co-operative Department (through taluka development associations) has popularised improved seeds and ploughs (129).
on Cultivators' own plots, preferable (129).
Farms, Government, have not influenced cultivators much, because not on commercial lines (129) 59847-53, 59865-6.
Taluka Development Associations : should do all demonstration and propaganda and should be subsidised by Government (129).

EDUCATION :

Agricultural efficiency not improved by (133).
Attendance in 4th class poor owing to boys having to work (133).

HUSSAIN, K. B. NABI BAKSH MAHAMMAD—concld.

FINANCE :

Land Mortgage Banks :
for Long term credit (129).
should facilitate Redemption of mortgages (131).
Long term : land mortgage banks seem to be the only solution (129).
Short term : sufficiently well catered for by co-operative societies (129).
Taccavi : greater promptness and less formalities advocated (129).

IMPLEMENTS :

Ploughs : Sindhi, cumbrous (132).
Taluka Development Associations : have introduced improved plough ; propaganda should be left to them (132).

MARKETING :

Facilities : no markets in the proper sense of the word (132).
Information, marketing, should be placed at disposal of cultivators (132).
Moneylenders : are middlemen ; buy agricultural produce at very low prices and cheat in weighment (131) ; buy crop before harvest and sell back to cultivator at 20 per cent. profit 6 months later (132).
Revenue collection compels cultivators to sell crop before harvest at low prices (129) (132).

STATISTICS :

Division of produce between zamindars and haris, revenue officers should be present at and keep accounts of (133).
Yield estimates, not satisfactory (133).

TALUKA DEVELOPMENT ASSOCIATIONS :

Agricultural propaganda : have done a great deal of work ; should be left to them entirely (129) (132).
Government subsidies advocated (129).
Ploughs : have done much to improve (132).

VETERINARY :

Department : Services unsatisfactory (129).
Dispensaries : Insufficient number (129).

WELFARE OF RURAL POPULATION :

Dispensaries, more required (133).
Drinking water, supply required (133).
Education, necessary for welfare (133).
Propaganda, sanitary, by lectures and lantern slides, advocated (133).

IMPLEMENTS.

Agricultural Department : do not Understand manufacture of implements, *Musto* (92), 59458-62.
Archimedian hand screw : on the market and being used to some extent, *Rahman* (141).
Chaff-cutters, *Musto*, 59379-80.
Co-operative societies should stock, issue on easy payment terms and maintain repair depôts, *Musto* (91-2).
Cotton gins, oil presses, etc., would be made privately, *Musto* (91).
Demonstrations should be made by Agricultural Department, *Musto* (91).
Forests : utilisation of labour-saving implements unsuccessfully attempted, *Aitchison*, 60333-4.
Government should allot more funds for purchase of improved implements and free distribution (if possible) among cultivators, *Bhutto* (66-7) (70).
Harrow, produced locally in the Deccan, *Musto*, 59378.
Labour-saving implements : will be necessary after Lloyd Barrage is completed as there will be shortage of labour, *Rahman*, 60129-30.
List of implements being brought to the notice of the agriculturists, *Rahman* (146).
Local manufacture, *Musto* (91-2).

IMPLEMENTS—contd.

Obstacles :
Agents : lack of, in the mofussil, *Musto* (92).
Cheap labour and hari system, *Rahman* (145-6).
Finance : difficulty of purchaser paying cash, *Musto* (92).

PLOUGHS :
Egyptian :
Heavy, inverting, *Rahman* (145).
replacing Sindhi ; is as simple as Sindhi plough and can be manufactured locally, but its work is far superior, especially in soft soil, *Azimkhan* (103).
Scope for, but cattle too poor, *Rahman* (145).
largely Used and manufactured, *Rahman* (145).
Importance of, *Musto* (91) 59375-7.
Improved, successfully introduced in Jamrao area, *Dow* (36).
Iron :
Designed locally, probably better than European design, *Musto* (91).
Used in Guni Taluka, *Shewakram*, 60878-80.
Lyallpur ploughs supplied by Jacobabad Government Farm ; successful, *Khoso*, 60189-91.
Meston :
Iron plough as cheap as Egyptian but fit for hard soil, *Azimkhan* (103).
on the Market and being used to some extent, *Rahman* (141) (145).
Sarkar, a modification of Egyptian plough, generally adopted in some districts and locally manufactured in thousands annually, *Rahman* (141).
Sindhi, cumbrous, *Hussain* (132).
Types : Egyptian, Meston, Rajah, Chatanuga, Monsoon, found useful, *Azimkhan* (103).
Ploughing zamindari lands on hire system, to train haris in use of improved impiements, *Rahman* (142).
Prices : should be reduced by means of Government bounties, *Bhutto* (71).
Private enterprise should be encouraged to hire out expensive machinery, *Musto* (94).
Quality and variety very poor, *Rahman* (145).
Repairs, importance of providing facilities for, *Bhutto* (70).
no great Successes, *Bhutto* (67) 59165-6.
Threshing machines should be let out on hire by Agricultural Department, *Bhutto* (66-7) ; through Co-operative societies, *Bhutto*, 59301.

TRACTORS :
Caterpillar on wet ground, *Musto*, 59407-9 ; Difficulty on sandy soil not insuperable, *Musto*, 59480-4.
Cultivation costs : *Rahman*, 59968-70, 60109-10.
Difficulty owing to smallness of plots under irrigation rules and undergrowth, *Rahman*, 59970.
Educated young men holding land co-operatively might use tractors, *Rahman*, 60117-9.
Efficiency : do superior work ; comparison with ordinary plough, *Rahman*, 60111-4.
Instances of use, *Rahman*, 59971-81, 60115-16.
should be Let out on hire by Agricultural Department, *Bhutto* (66-7) ; through Co-operative societies, *Bhutto*, 59301.
Private company should undertake ploughing, too much capital would be required for co-operative societies, *Musto*, 59410-3.
Recommended, *Shahani* (204).
Steam and motor, should be encouraged where possible, *Musto* (91) ; for reclaiming kalar soil, *Musto*, 59386-7.
Transport facilities necessary to hasten adoption of improved implements, *Shahani* (204).
Workshops should be opened by private enterprise, *Musto* (91) ; but co-operative societies should purchase implements manufactured, *Musto*, 59452-7.

IMPROVEMENTS, *see under* **CAPITAL.**

INDEBTEDNESS, *see under* **AGRICULTURAL INDEBTEDNESS.**

INOCULATION, *see under* **VETERINARY.**

INTEREST, *see under* **AGRICULTURAL INDEBTEDNESS** *and* **CO-OPERATION.**

IRRIGATION (*see also under* **HARRISON** *and* **SHEWAKRAM**).

Baluchistan, possibilities of control of water from, *Musto* (90) 59472.
Barrages on Indus at extreme North of Sind and at Kotri should be investigated, *Musto* (90); desirable within 15 years, *Musto*, 59439-41; investigation to start at once, *Musto*, 59466-71.
Clearance of canals: sufficient money spent on; no money earmarked for the purpose, *Musto*, 59420.
Cotton: American, cultivation of, restricted in the past by unstable water-supply, *Dow* (38).
Department is under-staffed, *Musto*, 59469-70.

DISTRIBUTION:

Begari canal: unequal distribution, *Khoso*, 60218-23.
Board of representatives of zamindars, Agricultural and Irrigation Departments should be entrusted to, *Rahman*, 60138-9.
Detailed distribution should be left to landholders, *Bhutto* (69), through a committee, *Bhutto*, 59296.
Dishonesty of Government officials, *Bhutto* (69).
Improvements suggested: silt clearance, excavation of branch karias, prevention of excessive drawing of water, restriction on paddy cultivation, *Khoso* (167).
Internal distribution in holdings should be left to holders, *Shahani* (203).
should be by a Joint committee, half zamindars; Engineering Department make mistakes because no agricultural experience, *Karachi Indian Merchants' Association*, 60446-7.
Karias should be widened, *Khoso*, 60249-50, 60267-70.
Modules, *see below*.
Open karia heads or plain sluices, entirely unsatisfactory, favouring the upper reaches, *Musto* (90-1) 59364.
Quarrels of landholders, *Bhutto* (69).
not Satisfactory, *Bhutto* (69).
System of rotation satisfactory, *Khoso* (167).
Uniformity advocated, *Shahani* (203).
Wastage of water through superabundant supply at tail of canals, *Shahani* (203).
Drainage, *see under* **SOILS.**
Experimental stations: several required, *Musto* (89). (*See under* RESEARCH.)
Forests: supply for meadows in, should be increased, *Khoso* (168).
Gaj Nai River, administration of, *Musto*, 59383-5.
Grazing grounds, attached to villages, should be supplied free, *Karacni Indian Merchants' Association*, 60521-2.
Hakabo: water rate charged to *jagirdars* who do not pay land revenue: no obligation ever undertaken by Government to spend on silt clearance, *Dow*, 59131-2.
Huris: should be supplied free or at lower rates, *Karachi Indian Merchants' Association*, 60523.
Inspector General of Irrigation: post should be revived, *Musto*, 59426-7.
Jacobabad District: great deficiency of water, *Khoso* (167) 60257-60.

JAMRAO CANAL:

Designed to be perennial; Head should be improved, *Shahani* (203).

KOTRI BARRAGE:

Construction of, recommended, *Bhutto* (69) 59295; Investigation necessary, *Musto* (90) 59439-41, 59466-71; Kotri: weir should be constructed at, *Shahani* (203).

LIFT, by pumping:

Cattle would be released for field work, *Dow* (38).
Centrifugal pumps best, *Musto*, 59381-2.
Co-operative societies might do, *Dow*, 59076, *Bhutto*, 59286-7.
Importance of, *Dow* (37-8) 59028.
Investigation recommended, *Dow* (37-8) 59028.
Lloyd Barrage, *see under* that main heading.
Minor schemes (tanks, ponds, wells): enough being done, *Bhutto* (69).
Modules:
Advocated; under Consideration for 20 years; to give Equal shares to head and tail; Successful in the Punjab; Different types suitable for different conditions; Zamindars at tail in favour while head zamindars are opposed, *Musto* (90-1), 59364-7, 59419, 59444-9, 59476-7.

IRRIGATION –contd.

Modules—*contd.*

Recommended, if properly worked, *Shahani*, 60721-5.
Neglect of irrigation in Sind, *Bhutto* (68).

NON-BARRAGE ZONE :

Adversely affected by Lloyd Barrage, *Bhutto* (69) 59295.
Barrage will have very little effect on level of Indus below it, 59414-5 ; will not appreciably suffer, *Musto*, 59478-9.
Loans, taccavi or co-operative, necessary to encourage development of wells, *Rahman* (144) 60067-8.
Poverty of cultivators due to lack of water, etc., *Bhutto*, 59154-5, 59289.
Punjab irrigation schemes, adversely affecting water supply in Sind, *Bhutto* (68) 59295.
Reservoirs, possibilities of in Baluchistan should be investigated, *Musto* (90).

RICE :

Restriction of cultivation recommended ; Water consumption 10 times that of dry crops, *Khoso* (167) 60224-6.
Screw water lift, found useful, *Azimkhan* (103).
Silt clearance, often not necessary, *Dow*, 59131-2.
Sub-Soil water : research necessary to prevent waterlogging, *Shahani*, 60540.
Tanks and ponds : for storage for winter crops, *Shahani* (203).
WELLS : (*See also* DRINKING WATER *under* **WELFARE OF RURAL POPULATION.**)
Persian wheel worked by bullock power too costly, *Karachi Indian Merchants' Association* (183-4) 60364, 60524-5.
Tube :
Advocated where subsoil is sweet, *Shahani* (203) 60540-1.
Co-operative recommended, *Karachi Indian Merchants' Association* (183-4) 60364, 60524-5.
Power recommended ; Research necessary, *Karachi Indian Merchants' Association* (183-4) 60364, 60524-5.

JERROM, J. H. G., Superintendent, Civil Veterinary Department, Sind and Rajputana, Karachi (85-6).
Qualified at Royal College in 1907, came to Karachi in 1921, 59314-5.

ANIMAL HUSBANDRY :

Castration : Increase in, by Burdizzo method, 59309 ; Not Successful over two years old, 59349-52.
Cattle-breeding : Agricultural Department in charge of, 59306 ; Profitable, 59316-9.
Karachi cattle : Export, large, to Java, Formosa and Ceylon, for milking, 59316-22 ; Indian, pure, no non-Indian blood, 59308 ; Milch, purely, 59307.

RESEARCH :

Veterinary, further facilities desirable (85).

VETERINARY :

Contagious diseases :
Legislation beneficial, but difficult to enforce and expensive (85) 59326-7.
Obstacles to dealing with : ignorance, not promptly reported (85) 59330 ; objection to inoculation or slaughter, cattle coming from Indian States (85) 59327.
Department : should be independent (85), 59311 ; should have a veterinary Officer as its departmental head but might be in charge of Minister of Agriculture, 59328-9.
Dispensaries :
Extension necessary, but prevented by lack of funds (85) 59345 ; under Local district board, system not satisfactory (85), owing to joint control, 59323-4 ; Propaganda work necessary (85) ; Provincial authority should control (85) ; no Touring owing to lack of funds (85), 59333 ; Use of, by agriculturists, not full (85) ; Wound cases principally dealt with, 59336-7.
Inoculation : No obstacles to popularising ; no fees charged (85) 59325.
Muktesar Institute : extension advocated ; should conduct research in the smaller Provinces (85).

JERROM, J. H. G.—contd.

VETERINARY—*contd.*

Provincial research institutes required in the larger provinces (85).
Research, further facilities desirable (85).
Rinderpest : Principal disease in Sind, Serum-alone method employed, not serum-simultaneous, 59304-5.
Serum : No difficulty in obtaining sufficient (85) 59310.
Staff : Recruitment and pay :
Assistants, all except one, Sindhis ; take scholarships at Bombay Veterinary College ; start at Rs. 75 going up to Rs. 155.
two Inspectors start at Rs. 175, going up to Rs. 225, 59342-8.
Superior Veterinary Officer with the Government of India, appointment of recommended, to co-ordinate and outline policy (85).
Surra : a few cases, 59338.
Veterinary Officer in Sind directly under Bombay Government through the Commissioner in Sind, 59311.

JESWANI (witness), *see under* **KARACHI INDIAN MERCHANTS' ASSOCIATION.**

KALAR LAND, *see* ALKALI *under* **SOILS.**

KARACHI INDIAN MERCHANTS' ASSOCIATION, Bunder Road, Karachi, represented by Mr. Jeswani (181-97).
Adulteration : has not considered what should be done to prevent, 60400-8 ; to the advantage of the members that pure seed should be supplied to cultivators by small shopkeepers, 60486-94 ; has set up standards of purity for cotton and wheat, 60409-13.
Compulsory arbitration clause used in contracts between members ; has worked quite well, 60478-83.
Members, largely exporters of grain, oil seeds and cotton, 60387-90 ; are largely commission agents, though some own factories ; less than one-fifth export on their own account, 60409-21.
Objects, 60344-6 ; has not interested itself in details of marketing in the mofussil, 60365-8, 60391-3.

ADMINISTRATION :

Director of Agriculture, separate, required for Sind (181).
Posts and Telegraphs : pice postcard, stoppage of, has hit agriculturists badly (183).
Wireless broadcasting should be fully utilised (182) ; loud speakers should be set up by every district local board (183).
Transport :
Railways, should have low rates for agricultural requirements ; feeder lines needed (183).
Roads, miserable state in rural area adversely affects agriculturists (183).

AGRICULTURAL INDEBTEDNESS :

Causes of borrowing : insufficient income, heavy interest, lack of education and thrift (183).
Measures for relieving agriculture's burden of debt : making agriculture more remunerative, subsidiary industries, reducing interest and middlemen's profits, education and propaganda, provision of credit facilities, legislation necessary (183).

AGRICULTURAL INDUSTRIES :

Health conditions, devotion of spare time to improving : propaganda for agricultural improvements advocated (184).
Implements, agricultural, manufacture of ; Leather goods, manufacture of ; Oil-seed crushing near large towns ; Toys, wooden ; Weaving, advocated (183-4).
Indebtedness might be relieved by (183).
Study, intensive, of each rural industry : very important ; permanent board recommended (184).

AGRICULTURAL LABOUR : *See under* LLOYD BARRAGE.

KARACHI INDIAN MERCHANTS' ASSOCIATION—contd.

ARBITRATION : of disputes, advocated, (183) 60478-85.

CO-OPERATION : Fragmentation of holdings should be prevented by (183).
Joint farming societies, of educated young men, on Lloyd Barrage land, desirable if members do manual work themselves, 60451.

CROPS AND CROP PROTECTION :
Cattle straying, damaging crops : serious ; quick growing hedge plant should be evolved (184) 60518-9 ; prickly pear does not injure crops, grows quickly and supplies itself with water, but gives no crop or fuel, 60526-8.
Pests : serious, making agriculture precarious ; research and then propaganda and demonstration necessary ; expenditure on this may make future remissions of taxation unnecessary (184) 60518.
Seed distribution : smallholder generally gets his seed from zamindar ; village shopkeeper not sufficiently educated to be trusted with distribution, 60486-94.

DEMONSTRATION AND PROPAGANDA :
Cinema and magic lantern advocated (182).
Cultivators : are not conservative ; are willing to adopt methods proved to be effective ; importance of sympathy with (182).
on Cultivators' own fields, advocated (181) ; and on model farms (182).
Leaflets in vernacular and Lectures advocated (182).
Organisation : should be central : Director of Agriculture should have advisory board representing agriculturists, etc. (181).
Wireless broadcasting should be fully utilised (182).

EDUCATION :
Agricultural :
Bias, all education should have (181).
College at the Research station necessary (182) ; demand for, would arise under *Lloyd Barrage* conditions, 60375-8 ; preferable to an Arts College, 60434.
High schools, in Lower and Upper Sind, with a four years' course, necessary (182) ; demand will arise under *Lloyd Barrage* conditions, 60422-4.
Poona Agricultural College : too distant and course too theoretical, 60495-508.
Primary schools :
Agricultural with farms attached ; would prevent migration to towns (181-2).
Boys would attend between the ages of 7 and 10, 60474-7.
Curriculum : reading, writing and arithmetic should also be taught, 60352-3, 60435-6.
Requirements : at least one at headquarters of every division and centre of large group of villages (182).
Agriculture Day, All-India, should be observed (182).
Indebtedness might be relieved by (183).
Mirpurkhas school : failed because it was carried on under artificial conditions and owing to unreasonable attitude of zamindars, which has changed, 60379-81.
Nature study advocated, 60354.
Organisation, should be central ; Director of Agriculture should have advisory board representing agriculturists, etc. (181).
Schools : Attendance should be in the non-crop season and in the afternoon ; methods are too dull (182).
Vocational training of children, advocated, 60352-64.
Wireless, broadcasting should be fully utilised (182).

FORESTS :
Firewood :
Canals, growing of trees on banks of, and of karias, recommended and in huris (184).
Price would be decreased by light railways in forests, 60449.
Grazing :
Corruption in lower ranks of department, 60448-50 ; Fees, heavy, 60448-50 ; Grounds should be attached to every village, 60519-22 ; Restrictions, undue, 60448-50.
Huris : Advocated for fodder and fuel (184) ; small huris should be Revenue free, 60519-23.

KARACHI INDIAN MERCHANTS' ASSOCIATION—contd.

HARIS :

Batai system : on lift land hari takes two-thirds and zamindar one-third ; on flow lands half and half, 60439.

Loans : hari pays 18 to 36 per cent interest on loans from shopkeepers and zamindars ; most zamindars lend money to haris ; Mohammedan zamindars take interest in produce but not in cash ; hari gets much less than the share of produce which is stated to be given to him, 60439-45, 60531.

Taccavi : advanced by zamindar to hari, usually without interest, usually Rs. 100 per holding of 10 acres of lift land which is irrigated by one wheel, 60461-71.

HOLDINGS :

Fragmentation : essential importance of preventing ; may be prevented by legislation but as far as possible should be done by co-operative effort ; area of individual holdings may be fixed (183) ; 25 acres the smallest economic holding, 60455-7.

Large holdings : not exploited to the best economic advantage of the country when too large, 60455-7.

IRRIGATION :

Distribution : should be by a joint committee, half zamindars ; Engineering Department make mistakes because no agricultural experience, 60446-7.

Grazing grounds, attached to villages, should be supplied free, 60521-2.

Huris : should be supplied free or at lower rates, 60523.

Wells : tube, worked by power, co-operative, advocated ; research necessary ; Persian wheel worked by bullock power too costly (183-4) 60364, 60524-5.

LLOYD BARRAGE : 60451-7, 60495-508. For details *see under* that main head.

MARKETING :

Adulteration (*see under* main title MARKETING).

Competition among buyers, good effect of (184).

Cotton Markets Bill : now before Council ; Karachi Indian Merchants' Association thinks it will not improve conditions, 60382-4 ; Jeswani thinks it will help the grower, 60458-60.

Indebtedness :

unfair Prices paid by shopkeepers from whom cultivators have borrowed money ; competition among shareholders decreasing this practice (184).

might be Relieved by reducing undue profits made by middlemen (183).

Information, marketing : reaches cultivators owing to increased competition between merchants, middlemen and buyers (184).

Quality : cultivator has not been encouraged by increased prices to improve quality of his produce, 60365-72.

RESEARCH :

Finance : 1 per cent of revenues of Central and Provincial Governments and ½ per cent of revenues of district boards, should be contributed to an agricultural development fund, 60347-9 ; for all-India 4 crores, in Bombay Presidency 18 lakhs, divisional boards half a crore, 60472-3 ; expenditure on research may obviate remission of land revenue (184).

Hedge plant, quick growing, should be evolved, to protect crops from straying cattle (184), 60518-9 ; prickly pear, 60526-8.

Pests : (184), 60518.

Sakrand Farm : experimenting on watering, seeds, kallar, rotation, etc., 60516-7.

Station :

should be Directed by Director of Agriculture assisted by an advisory board representing agriculturists, etc. (182) 60373-4.

with Permanent endowment, needed in Sind (181).

Sakrand probably a suitable site, 60350-1.

TALUKA DEVELOPMENT ASSOCIATIONS : advocated, 60509.

VETERINARY : Department : officials should attend at peasants' farms (183).

KARACHI INDIAN MERCHANTS' ASSOCIATION—concld.

WELFARE OF RURAL POPULATION :

Drinking water : tube wells worked by power co-operatively, advocated (183).
Health conditions : economic improvement necessary (184).
Malaria : regular surveys of talukas necessary (185).
Non-official organisation proposed to improve economic position of cultivators (185), 60453 ; none exists, 60385-6, 60509-15.
Surveys : economic and health advocated ; should be non-official (185).

KHOSO, KHAN BAHADUR DILMURADKHAN BAHADURKHAN, President, Jacobabad Municipality and Zamindar, Jacobabad (166-74).
Family holding of land, 60182-4 ; cultivated on batai system, 60192-4 ; 40,000 acres, 60224, 60235, 60277.

ADMINISTRATION :

Transport : Railways : satisfactory ; Roads, bad, Government grants necessary ; Steamers, satisfactory (166).

AGRICULTURAL DEPARTMENT : Services : satisfactory (166).

AGRICULTURAL INDEBTEDNESS :

Causes of borrowing : heavy expenses, heavy interest, water deficiency, want of control of taccavi given to haris ; heavy taxation, (*see* Land Revenue), and inadequate remissions, expenses of excavation (167).
Marketing : borrowers have to sell their produce to sowcars, 60219-3.
Measures to relieve agriculture's burden of debt : prices of grain should be Published (167) ; Taccavi should be advanced to co-operative credit societies (167).

AGRICULTURAL LABOUR : Scarcity in Jacobabad District, 60207-8 ; due to idling, 60207-9, 60248.

ANIMAL HUSBANDRY :

Breeding : Bhagnari and Cutchi cattle successfully imported to improve breed, 60198-9. Fodder : scarcity of in Jacobabad because there are no forests, 60200 ; Forests : necessary in every taluka for grazing ; Grass land should be free of tax (167).

CO-OPERATION :

Credit societies : Collapse of a society in Jacobabad District owing to non-repayment of loans, 60214-7 ; Taccavi grants should be made to (167).

CROPS AND CROP PROTECTION :
Juar : cultivation of, should be increased (167).
Rice : cultivation should be Restricted as to irrigation (167) ; consumes 10 times as much Water as dry crops, 60224-6.
Seed Distribution :
Wheat : Pusa 12, obtained from Jacobabad Government Farm, 60187-8.
Variety, large, of crops, advocated (167).
Wild animals, damage by : more gun licenses should be issued to zamindars (167), 60263-4.

DEMONSTRATION AND PROPAGANDA : Decorations should be given to Zamindars (166) ; Government should give small strips of land to zamindars (166) ; to encourage good cultivation, 60240-1.

EDUCATION :
Administration of educational schemes including adult : could be through zamindars with Government financial help (166).
Agricultural : (166, 168), 60241, 60273-7.

FERTILISERS : Artificial : less profitable than natural manure (167) ; Cowdung, use of, as fuel : should be penalised (167), 60201-2.

KHOSO, K. B. DILMURADKHAN BAHADURKHAN—contd.

FORESTS :

Destruction of, has caused great loss of fuel and grass (168).
Fodder : scarcity of in Jacobabad because there are no forests, 60200.
Fuel : loss of owing to destruction of forests in Jacobabad (168), 60201-2.
Grazing :
Charges should be reduced (168), 60265-6.
forests necessary in every Taluka for grazing (167).
Irrigation : water supply should be increased as meadows are insufficient (168).
Village forests advocated (168).

HARIS :

Restrictions : legislation advocated prohibiting haris from doing any but agricultural work which they should be compelled to do (168), 60251 ; and preventing them from leaving the village until they have repaid loans (168).
Subsidiary industries : haris would profit by, but these should not be encouraged as cultivation would suffer (168) ; haris are few and insufficient, have no unemployed season : time not occupied in actual cultivation should be employed in land improvement (167), 60252-3.
Taccavi grants to haris are not properly controlled (166-7) ; legislation necessary to prevent haris leaving village until they have repaid taccavi loans (168) ; run away when there are good rains in Baluchistan, 60207-8 ; legislation necessary to prevent haris absconding with money advanced by zamindars, 60246-7 ; present law inadequate ; Workmen's Breach of Contract Act advocated, 60254-6.
Tenure : receive a share of the produce on batai system, 60192-4 ; have no right to the land, 60261-2.

HOLDINGS :

Fragmentation : difficulty of Mahommedan law of inheritance which cannot be amended (167).
Legislation to deal with minors, widows, etc. ; present law inadequate ; zamindars should be attached to Courts to give advice (167).

IMPLEMENTS : Ploughs : Lyallpur ploughs supplied by Jacobabad Government Farm ; successful, 60189-91.
Indebtedness, caused by heavy traction, 60248.

IRRIGATION :

Distribution of canal water : Begari canal : unequal distribution, 60218-23 ; Improvements suggested : silt clearance, excavation of branch karias, prevention of excessive drawing of water, restriction on paddy cultivation (167) ; Karias should be widened, 60249-50, 60267-70 ; System of rotation satisfactory (167) ; great deficiency of water in Jacobabad District (167), 60257-60.

LAND REVENUE : amount levied, 60228-9.

LLOYD BARRAGE :

Jacobabad district : only part will be benefited, 60203-4.
Labour : no scarcity when Barrage working if idleness were discouraged, 60209.

MARKETING :

Information, marketing, should be supplied to zamindars and traders (167) ; including prices in foreign markets, 60242-5.
Moneylenders : borrowers have to sell their produce to, 60210-3.

RESEARCH :

Enquiry necessary as to backward state agriculturally of Upper Sind Frontier district (166) ; Skilled workers : great need of (166).

SOILS : Improvement : in Jacobabad by increasing water supply (167).

VETERINARY :

Department : some Assistance given to cultivators, but cultivators not used to taking assistance ; 60195; should be under Director of Agriculture (167) ; Satisfactory (166).

KHOSO, K. B. DILMURADKHAN BAHADURKHAN—concld.

VETERINARY—*contd.*

Disease : in cattle increasing, research necessary (166).
Rinderpest : inoculation advocated, 60196-7.

LABOUR, *see under* **AGRICULTURAL LABOUR,** and *see* HARIS *under* **LAND TENURE.**

LAND ALIENATION ACT, *see under* **AGRICULTURAL INDEBTEDNESS.**

LAND REVENUE :

Amount levied, *Khoso*, 60228-9.

LAND TENURE :

BATAI SYSTEM :

Division of produce : on lift lands zamindar takes two-fifths, on flow lands half the produce ; a fair arrangement, *Bhutto*, 59135-43.
Hari gets much less than the share of produce stated to be given to him, *Karachi Indian Merchants' Association*, 60445.
Income from rice about Rs. 40 per acre, juar Rs. 20, of which zamindar takes half and pays revenue, *Bhutto*, 59246-52.
Rent paid in kind, *Bhutto*, 59227-36.
Zamindar pays assessment, advances taccavi and pays interest, clears kariyas, etc., *Bhutto*, 59195-8.

BURDENS ON LAND :

local Cesses ; rasai (providing for touring officials) ; lapo paid to officials who collect revenues ; corruption ; assessment Rs. 6-10-0, *Bhutto*, 59199-205 ; system of administration blamed ; committee appointed as to rasai and lapo, but nuisance remains, *Bhutto*, 59253-63 ; should be discouraged ; rasai and lapo come out of zamindar's share of produce, but hari has to contribute labour ; touring officials should only accept hospitality from well-to-do people, *Bhutto*, 59281-4.
cause Poverty of cultivator, *Bhutto*, 59154-5.
Settlement every 20 years, *Bhutto*, 59227-36.
Distribution of produce : zamindar takes half on flow land and one-third on lift land, *Dow*, 58998-9.

HARIS :

Co-operative farming society suggested as an experiment, *Rahman*, 60103-4.
Freeholders, haris should be established as, *Dow*, 59068-70, 59108-12.
Education, *see under* that heading.

INDEBTEDNESS :

in Bad seasons zamindars are forced to take cattle of haris in payment and incur losses, *Shewakram*, 60847.
Bania charges 25 to 30 per cent., *Shewakram* (222).
zamindars should be Financed at 6 per cent and should be bound to finance their haris at 9 per cent, *Shewakram* (222) ; zamindars charge their haris from 12 to 25 per cent, *Shewakram*, 60847.
Mahommedan zamindars lose on advances made to haris who abscond without repaying, *Shahani*, 60572-9, *Shewakram* (222), 60847.
in view of Labour scarcity, should be treated humanely and equitably in order to attract labour from surrounding areas, *Azimkhan* (106).
Loans : hari pays 18 to 36 per cent interest on loans from shopkeepers and zamindars ; most zamindars lend money to haris ; Mohammedan zamindars take interest in produce but not in cash ; *Karachi Indian Merchants' Association*, 60439-45, 60531.
Numbers, by far the largest class of agriculturists, *Rahman* (141).
Outturn : both cultivator and zamindar have an interest in increasing, *Dow*, 59023.
Restrictions : legislation advocated prohibiting haris from doing any but agricultural work which they should be compelled to do, *Khoso* (168), 60251 ; and preventing them from leaving the village until they have repaid loans, *Khoso* (168).

LAND TENURE—concld.

HARIS—*contd.*

Scarcity of, *Azimkhan*, 59679-80.
Share of produce: some zamindars make small deductions for charity from haris' half share of produce; on 10 acres growing cotton hari would get about Rs. 150 to Rs. 200 under normal conditions, *Rahman*, 60142-8.
Status: entirely dependent upon landlords for agricultural requisities and maintenance, *Rahman* (141); are landless; not very desirable state of things, *Rahman*, 60077-8.
Subsidiary industries: haris would profit by, but these should not be encouraged as cultivation would suffer, *Khoso* (168); haris are few and insufficient, have no unemployed season: time not occupied in actual cultivation should be employed in land improvement, *Khoso* (167), 60252-3.
Suggestions: land could be given to intelligent haris, but not to all. Jamrao colonisation scheme with Punjabis has been successful, but Sindhi haris are indolent and different from Punjabis, experiment along the lines of the Jamrao suggested under Lloyd Barrage; danger of depriving zamindars of supply of labour, *Rahman*, 60077-85, 60101-2.
Taccavi grants to haris:
Control inadequate, *Khoso* (166-7).
Legislation necessary to prevent haris, leaving village until they have repaid to zamindar, *Khoso* (168), 60207-8, 60254-6, *Karachi Indian Merchants' Association*, 60461-71, *Shahani*, 60572-9.
Workmens' Breach of Contract Act advocated, *Khoso*, 60254-6.
Zamindars advance to haris, usually without interest, *Karachi Indian Merchants' Association*, 60461-71.
Tenure: receive a share of the produce on batai system, *Khoso*, 60192-4; have no right to the land, *Khoso*, 60261-2, *Dow*, 58998-9002, 59021-2, *Bhutto*, 59227-8.
Welfare: are under mujeris who are under zamindars; haris employ labourers, *Shahani*, 60625-30; relations with zamindars are very good; many zamindars treat haris well; zamindars who misbehave should be dispossessed by committees of villages, taluks, etc.; excessively large holdings should be prohibited; status of haris should be improved; should not be quite tenants at will, *Shahani*, 60696-703; taluka development and similar associations recommended; Deccan Agriculturists' Relief Act has made haris more dishonest, *Shahani*, 60708-11, has not known one zamindar who has improved the housing or educational conditions of his haris, *Shahani*, 60726, *Azimkhan*, 59594-8.
Zamindar does not usually help the hari in cultivation, *Dow*, 59067; relationship with, good, *Azimkhan*, 59674-83.
Peasant tenantship, such as exists in Sudan, should be considered, *Dow*, 59071.

LAPO, *see* BURDENS ON LAND *under* **LAND TENURE**.

LLOYD BARRAGE (*see also under* **DOW** *and* **MANN**).

Agricultural Department: staff will have to be increased, *Rahman*, 60140-1.
Alkali: a distinct danger, but can be met; quantity of salt in the soil greater than in almost any part of the world that is under cultivation; funds for investigation inadequate, *Mann*, 58697-9.
Capital: will be attracted by, *Rahman* (149).

COLONISATION:
Auction of land might encourage speculators, *Mann*, 58654-5.
Capitalist farming should not be excluded but should not be principally relied on, *Mann*, 58708.
by Communities might be tried, *Rahman*, 60120.

Haris: *see under* **LAND TENURE**:

Land will be divided into squares on the Punjab plan, *Mann*, 58656.
Policy not yet formulated, *Mann*, 58650-5.
Punjab experience might be utilised, *Mann*, 58694-6.
Small holders, encouragement of, advocated, *Mann*, 58646-9, 58688-90
large Syndicates and possibly co-operative societies of educated young men should be given grants of land, *Rahman*, 60117-9.
Contouring satisfactory, has been closely done, *Musto*, 59128-30.

LLOYD BARRAGE—contd.

COTTON :

Baker-Lane scheme does not provide for much cultivation, *Rahman*, 60179.
on Right Bank supposed not to be possible to grow cotton ; if it were possible a great saving of water would be effected, *Mann*, 58680-7.
Date : water probably available in 1932, *Musto*, 59335-6, 59463-5.
Development Scheme (*see under* **MANN**).
Distribution of water : agitation to lower duties, *Musto*, 59401.

DRAINAGE :

Finance : very large sum of money provided for, *Musto*, 59357.
Importance attached to drainage, *Musto*, 59362, 59369-71.
Schemes sufficient to guarantee that no undue waterlogging and soil deterioration will take place, *Musto*, 59358-61.
Waterlogging will take place if drainage is not attended to, *Musto*, 59400.
Educated young men : societies for joint farming advocated if members themselves do manual work, *Karachi Indian Merchants' Association*, 60451-2 ; training, 60495-508.
Employment : will lead to sufficient, in agricultural operations all the year round, *Rahman* (147).
Food Crops : percentage of total cropped area will be increased under Baker-Lane scheme, *Rahman*, 60177-9.

FORESTS :

Area : 70,000 acres set aside for, in blocks of varying sizes in old forests which under irrigation will grow excellent timber, *Aitchison*, 60281-7.
Experiments being made near Sukkur, *Aitchison*, 60308.
Huris (q.v.) will be irrigated at lower rates ; very little water required except to start, *Aitchison*, 60293-4, 60305-7.
Grazing area for camels and goats will be diminished by, *Aitchison* (175).
Holdings : should not be too large, *Karachi Indian Merchants' Association*, 60455-7.
Jacobabad district : only part will be benefited, *Khoso*, 60203-4.

LABOUR :

Attraction of labour from Rajputana and Cutch, *Karachi Indian Merchants' Association*, 60454.
from Baluchistan, Baluchs and Brahuis, *Musto*, 59389-92.
no Difficulty, because : cultivation under Baker-Lane scheme is mainly rabi and existing cultivation is kharif and flow irrigation requiring half or third labour required under lift irrigation, *Karachi Indian Merchants' Association*, 60454.
Grants of land should be made to attract, *Rahman* (147-8).
Implements, labour-saving, will be necessary as there will be labour shortage, *Rahman*, 60129-30.
Machinery should be used to economise labour, *Musto*, 91.
no Scarcity when Barrage working if idleness were discouraged, *Khoso*, 60209.
Non-Barrage area, *see under* Irrigation.
Regulators on canals, *Musto*, 59416-8.
Research : (*also see under* **MANN**) several experimental stations necessary for studying reclamation of kallar lands, duties on water for various crops, waterlogging, drainage and rotations, *Musto* (89) ; should be provincial, *Musto*, 59421-3.
Unemployment of cultivators will be decreased, *Musto* (92).
Waterlogging : danger of, if careful drainage not introduced, *Shahani* (203).

LONGTERM LOANS, *see under* **FINANCE.**

MALARIA *see under* **WELFARE OF RURAL POPULATION.**

MANURE *see under* **FERTILISERS.**

MANN, Dr. HAROLD H., D.Sc., Director of Agriculture, Bombay Presidency (1-9).

DEMONSTRATION AND PROPAGANDA :
Demand : great owing to change of methods, 58644-5.
Staff : in future will consist, as far as possible, of Sindhi Mussalmans, trained at Poona and Sakrand, 58641-3, 58691-3.

MANN, Dr. HAROLD H.—contd.

EDUCATION :

Agricultural College for Sind, strong local demand for, 58643, Poona Agricultural College is too far away ; Lyallpur Agricultural College charge the whole cost of students ; College should be situated in Barrage area, 58700-7.

LLOYD BARRAGE :

Alkali : a distinct danger, but can be met ; quantity of salt in the soil greater than in almost any part of the world that is under cultivation ; funds for investigation inadequate, 58697-9.
Colonisation :
Auction of land might encourage speculators, 58654-5.
Capitalist farming should not be excluded but should not be principally relied on, 58708.
Policy not yet formulated, 58650-5.
Punjab experience might be utilised, 58694-6.
Land will be divided into squares on the Punjab plan, 58656.
Small holders, encouragement of advocated, 58646-9, 58688-90.
Cotton : supposed not to be possible to grow cotton on Right Bank ; if it were possible a great saving of water would be effected, 58680-7.
Development Scheme :
Progress : further development of scheme advocated before 1931, when water will become available ; big developments in 1935-8 ; 40 years to complete project, 58626-8 ; present proposals will be ready within 12 months, 58639 ; in the following year proposals will be put before Government in connection with Right Bank conditions, 58657-9 ; Rs. 1,35,000 passed by Council ; additional expenditure proposed, 58672-9.
Proposals of Committee in 1924 accepted by Government in a very curtailed form because of heavy cost ; rate of progress unsatisfactory, 58626-8.
Research staff can be recruited, 58667-70.

RESEARCH :

Larkana :
Central station for Lloyd Barrage Right Bank Canals ; rice and bosi wheat area, with annual cropping, 58631-4 ; farm has been in existence since 1906 ; will be extended, 58660-1.
Progress : two years to get Right Bank into full working order, 58665-6 ; running expenses 1 lakh, 58676-9.
Water supply from Ghar canal and bores ; tube wells will be constructed, 58660-3.

Sakrand :

Central Cotton Committee contributing Rs. 20,000 a year for soil research, 58652-3.
Scope : established as representing left Bank Rohri Canal area, the largest section, with sub-stations to work out results, 58629-31 ; a cotton area with one cropping in 3 years, 58629-40.
Staff : will have 3 first class research officers, of whom one will be whole-time Director, 58629-40 ; botanist engaged on cotton, wheat and juar, 58652-3.
Water : tube well constructed, 58663-4.

Stations : 3 proposed :
Central station for Nara Valley, Representing Eastern Sind, 58629-40 ; no research stations other than Sakrand and Larkana to be started next year, 58665.
Larkana : *see above.*
Sakrand : *see above.*

MARKETING :

ADULTERATION :

(*see* also *under* COTTON and WHEAT below.)
Agricultural Department should interest itself in the problem, *Karachi Indian Merchants' Association*, 60407-421.
lack of Contact between exporters and cultivators, *Karachi Indian Merchants' Association*, 60404-6.

MARKETING—contd.

ADULTERATOIN—*contd.*

grain Contracts between exporting firms and commission agents specify percentages of foreign matter; doubtful if exporters will insist upon purity, *Karachi Indian Merchants' Association*, 60425-33.
often not Deliberate, *Karachi Indian Merchants' Association*, 60398.
cannot be done by large Exporters who are interested in seeing that produce is pure, *Karachi Indian Merchants' Associations*, 60399.
Originates where produce is grown and not at the port, *Karachi Indian Merchants' Association*, 60394-6.
supposed to be by village Shopkeeper, *Karachi Indian Merchants' Association*, 60397.
Competition among buyers, good effect of, *Karachi Indian Merchants' Association* (184).
Co-operative, *see* PURCHASE AND SALE SOCIETIES *under* **CO-OPERATION.**

Co-operative ginning and marketing advocated, *Shahani* (205).

COTTON:

Adulterated with leaves, dry bolls and water; no premium paid for purity by trade who themselves adulterate; legislation necessary, *Rahman*, 60094-100.
American, spread of, restricted in the past by bad marketing conditions, *Dow*, 58977-9.
Conditions unsatisfactory, not Graded, no regular Markets, *Azimkhan* (106-7); *Shahani* (205).
Cotton Markets Bill: now before Council; Karachi Indian Merchants' Association thinks it will not improve conditions, *Karachi Indian Merchants' Association*, 60382-4; Jeswani thinks it will help the grower, 60458-60; required, *Azimkhan* (109).
Factories appoint agents who appoint village Sowcars sub-agents, *Azimkhan* (107).
Ginning factories give reasonable conveniences to growers; their brokers arrange sales on growers' estates, supply gunnies, and arrange forward sales, *Rahman* (148).
Karachi merchants, factories sell ginned and baled cotton to, *Azimkhan* (107).
Middlemen's margin very large, *Shahani* (205).
Premium seldom paid to cultivators for improved quality, *Azimkhan* (108).
no better Price paid for long staple than for short, *Shahani* (205).
small Quantity of long staple offered for sale, *Shahani*, 60560-2.
Sowcar, cultivator at the mercy of, who does not quote proper market rates and uses false weights, *Azimkhan* (107).
Credit, need of, to enable cultivators to wait for the better prices, *Azimkhan* 59525-7.

FACILITIES:

Defective, especially sale of cotton: inadequate price and weight, excess of middlemen, no premium paid for improved varieties, *Azimkhan* (106-7).
existence of Ginning factories of responsible firms guarantees fair values being obtained, *Rahman* (148).
no regular Markets in the sense in which they exist elsewhere; but there are trade markets which are adequate for *bona fide* transactions where zamindar is not in debt, *Rahman* (148), *Hussain* (132).
Satisfactory, *Bhutto* (72).
Government should not interfere in packing, grading, etc., for market, *Bhutto* (72) 59278.
Fertilisers, sale should be under guaranteed government analysis, *Shahani* (204).

GRADING AND PACKING:

Attention required, *Rahman* (148).
Factory owners generally gin and bale cotton without sorting or grading, *Azimkhan* (107).
Legislation necessary, *Rahman* (148).
Standardisation of grading recommended, *Rahman* (148).

MARKETING—contd.

INFORMATION :

Co-operative societies should supply, *Bhutto* (72).
Cultivators obtain owing to increased competition between merchants, middlemen and buyers, *Karachi Indian Merchants' Association* (184).
should be Supplied to cultivators, *Azimkhan* (107), *Husain* (132), *Rahman* (148), *Khoso* (167) 60242-5, *Shahani* (205).
Telephone facilities should be placed at disposal of zamindars at nominal charges, *Shewakram* (222).
Legislation : Marketing Bill should be enacted, *Azimkhan* (107) (109) 59598; *Karachi Indian Merchants' Association*, 60382-4, 60458-60, *Azimkhan* (109).

MIDDLEMEN :

Margin very large, *Shahani* (205).
Number excessive, *Azimkhan* (107).
Sowcar, cultivator at the mercy of, *Azimkhan* (107), *Husain* (131-2), *Khoso*, 60210-3.
Moneylenders : are middlemen; buy agricultural produce at very low prices and cheat in weighment, *Hussain* (131); buy crop before harvest and sell back to cultivator at 20 per cent. profit 6 months later, *Hussain* (132), *Khoso*, 60210-3.
Premium for improved quality : rarely paid to cultivator, *Azimkhan* (107).
Prices, unfair, paid by shopkeepers from whom cultivators have borrowed money; competition among shop-keepers decreasing this practice, *Karachi Indian Merchants' Association* (184).

QUALITY :

Cultivator has not been encouraged by increased prices to improve quality of his produce, *Karachi Indian Merchants' Association*, 60365-72.
Names of distributors, *Shahani* (205) (208) 60546-52.

Revenue collection compels cultivators to sell crop before harvest at low prices, *Hussain* (129) (132).

RICE :

local Capitalists who have mills control market, but tendency to combine slowly decreasing owing to increase in number of mills, *Rahman* (148).
Chain of markets required which is prevented by lack of better roads and feeder lines, *Rahman* (148).
Conditions not satisfactory, *Rahman* (148).
Prices not always determined by supply and demand, *Rahman* (148).

RAILWAYS :
ROADS : } *see* TRANSPORT *under* **ADMINISTRATION.**
Weights and measures : moneylenders cheat in weighment, *Hussain* (131); *Azimkhan* (107).

WHEAT :

Adulteration suspected; marketed on the basis of certain admixture of foreign grain, *Rahman*, 60091-2.
Bania adulterates, *Rahman*, 60094-6.
European markets pay less for lower standards of purity but this has not improved purity of exported wheat, *Rahman*, 60099.
Exporting firms have sub-agencies at principal centres which purchase from big zamindars or through local traders at satisfactory prices, *Rahman* (148).
Legislation suggested, *Rahman*, 60092.
thought that some Merchants outside India accept wheat not pure and Indian export firms adulterate to that standard, *Rahman* 60100.
no Premium paid for purity, *Rahman*, 60092.
Small growers sell to village bania at low rates, *Rahman*, (148).

METEOROLOGICAL DEPARTMENT, *see under* **ADMINISTRATION.**

MIDDLE CLASS YOUTHS, ATTRACTION of, TO AGRICULTURE.

by making Agriculture more profitable, *Bhutto* (66).
by Demonstration that agriculture can be made profitable, *Shahani* (199).

MIDDLE CLASS YOUTHS, ATTRACTION OF, TO AGRICULTURE—contd.

by Grants of Land, *Shahani* (199), obstacles, lack of amenities, land and water, *Shahani*, 60636-43, 60684-93, 60727-8.
Middle class youths attracted to agriculture should be willing to start as haris, *Dow*, 59073-4, 59122-9.
by Restricting appointments in Agricultural, Forest and Revenue services mainly to such men when agriculturally trained, *Shahani* (199).
by Scholarships, *Khoso* (166).

MOHAG (*frontage*):
deterred by: lack of amenities on the land sought by educated people, 60636-43, and lack of land itself and of water, 60684-93, 60727-8.
Fallow forfeited land included in zamindar's existing mohag, *Dow*, 59024.
Meaning of: claim to land in the frontage of a zamindar which cannot be granted to another zamindar without injuring the former's rights of user or access to his existing holding; never claimed or recognised as a legal right; founded on conditions attaching to inundation irrigation, *Dow*, 58947-50; *Harrison*, 58791-2.
Provision for: Government in Lloyd Barrage scheme setting aside 3½ lakhs of acres representing 25 per cent of the total Government land available, *Dow*, 59024, 59079-80.
necessary to Recognise the claim to some extent under the Lloyd Barrage, *Dow*, 58951-52.

MONEYLENDERS, *see under* **AGRICULTURAL INDEBTEDNESS.**

MUJERIS: Managing cultivators: hold land under zamindars, which they let to haris, *Shahani*, 60629-30.

MUSTO, A. A., C.I.E., M.INST.C.E., Superintending Engineer, Lloyd Barrage Circle (89-102).
Experience: 59363-4, 59372-4, 59450-1; 59463-5.

ADMINISTRATION:

Transport:
Railways: should be greatly extended (89).
Roads: should be greatly extended (89); lack of Materials locally (97-8), 59402-3; Neglect by District Boards, 59405-6; Research as to use of brick and waste oil, 59404.

AGRICULTURAL DEPARTMENT:

Implements:
Officers do not understand manufacture of (92).

AGRICULTURAL INDUSTRIES:

Implements, manufacture of locally, should be encouraged (91-2).
Industrial concerns in rural areas: require full-time labour (92).
Leisure period: far less with perennial water-supply under Lloyd Barrage (92).
Private enterprise should develop (92).
Study of, by practical experts, necessary (92).
Village health conditions, spare-time should be devoted to (92).

AGRICULTURAL LABOUR:

Cultivation and development of areas not at present under cultivation:
Necessity of measures in newly opened areas under the Barrage, doubtful (92-3).
free Water should be given for two years, if necessary (92-3).
Machinery, should be used to economise labour under Lloyd Barrage conditions (91).
Migration: might be encouraged by free excursions to show conditions and by facilities for purchasing land (92).
Shortage of labour: none in Sind except in rice-transplanting and reaping seasons (92).

CAPITAL ATTRACTING OF, TO AGRICULTURE:

Water supply must be assured (94).

MUSTO, A. A.—contd.

CO-OPERATION :

Amateurs, employment of, undesirable (93).
Cattle breeding societies, doubtful (94).
Consolidation of holdings :
Societies should undertake (94).
holdings already Uneconomic should be acquired by the State (94).
Domestic current expenses, credit should be provided for (93).
Expert from Sweden, Denmark or England should be employed by Government (93).
Implements :
might be Hired out by societies (93).
Repair depôts should be maintained by societies (91-2).
should be Stocked and issued by societies (91-2).
Importance of, great (93).
Improvement of land for general benefit of locality should be financed and carried out on a co-operative basis (94).
Joint farming, doubtful (94).
Minorities should be compelled to come into joint improvement schemes, if large majority are in favour and scheme is approved by experts (94).
Purchase societies : should stock, sell and hire out implements and machinery (93).
Sale of produce and stock, expert examination of possibilities desirable (94).
Seed depôts : might be financed by Government and managed by co-operative societies (89).
Trained officers should remain at the work, 59434-8.

CROPS AND CROP PROTECTION :

Seed :
Depôts should be financed by Government and managed by co-operative societies or Government (89).
Free issue, value to be recovered from crop, until good strains are established (89).

DEMONSTRATION AND PROPAGANDA : on Cultivators' own fields, with normal water supply, if possible (89).

FINANCE : Seed might be issued free of cost and value recovered from crop, till good strains are established (89).

FORESTS :

Afforestation : probably opening for schemes, in the neighbourhood of villages (93).
Firewood and fodder production should be encouraged by remission of assessment (93).

HOLDINGS :

Co-operative societies should prevent fragmentation ; hoidings already uneconomic should be acquired by the State (94).
Fragmentation :
Evil more serious in Deccan than in Sind, 59398-9.
State purchase system might remedy (89-90).

IMPLEMENTS :

Chaff-cutters, 59379-80.
Co-operative societies should stock, issue on easy payment terms and maintain repair depôts (91-2).
Co-operative societies should finance purchase of, manufactured by private enterprise (91) 59452-7.
Demonstrations should be made by Agricultural Department (91).
Harrow, produced locally in the Deccan, 59378.
Local manufacture (91-2).
Obstacles : Agents : lack of, in the mofussil (92).
Finance : difficulty of purchaser paying cash (92).
Ploughs : Importance of (91) 59375-7.
Iron, designed locally, probably better than European design (91).

MUSTO, A. A.—contd.

IMPLEMENTS—*contd.*

Private enterprise should be encouraged to hire out expensive machinery (94).
Tractors: Caterpillar on wet ground, 59407-9; Difficulty on sandy soil not insuperable, 59480-4; Private company should undertake ploughing, too much capital would be required for co-operative society, 59410-3; Steam and motor, should be encouraged where possible (91), for reclaiming kallar soil, 59386-7.

IRRIGATION:

Baluchistan, possibilities of control of water from (90), 59472.
Barrages on Indus at extreme North of Sind and at Kotri should be investigated (90); desirable within 15 years, 59439-41; investigation to start at once; Department is under-staffed, 59466-71.
Clearance of canals: sufficient money spent on; no money earmarked for the purpose, 59420.
Distribution of canal water: by open karia heads or plain sluices, entirely unsatisfactory, favouring the upper reaches (90-1), 59364. (*See* Modules.)
Experimental stations: several required (89). (*See under* Research.)
Inspector General of Irrigation: post should be revived, 59426-7.
Lift: centrifugal pumps best, 59381-2.
Modules:
Advocated (90-1); under Consideration for 20 years, 59419; to give Equal shares to head and tail, 59364-7; Successful in the Punjab, 59476-7; different Types suitable for different conditions, 59444-9; Zamindars at tail in favour while head zamindars are opposed, 59476-7.
Non-Barrage Zone; Barrage will have very little effect on level of Indus below it, 59414-5, 59478-9.

LLOYD BARRAGE:

Contouring satisfactory, has been closely done, 59428-30.
Date: water probably available in 1932, 59335, 59463.
Drainage:
Finance: very large sum of money provided for, 59357.
Importance attached to drainage, 59362, 59369-71.
Schemes sufficient to guarantee that no undue waterlogging and soil deterioration will take place, 59358-61.
Waterlogging will take place if drainage is not attended to, 59400.
Distribution of water: agitation for lower duties, 59401.
Labour: from Baluchistan, Baluchs and Brahuis, 59389-92.
Regulators on canals: 59416-8.
Research: several experimental stations necessary for studying reclamation of kallar lands, duties on water for various crops, waterlogging, drainage and rotations (89); should be provincial, 59421-3.
Unemployment of cultivators will be decreased (92).

RESEARCH:

Administration: both Provincial and Central, 59421-31, 59425-7.
should be Co-ordinated by Inspector General of Irrigation, who should be re-appointed, 59425-7.
Hydraulic experiments: could be carried on at Sukkur; research officer should be appointed to investigate purely irrigation hydraulic problems, 59424.
Road-making; use of bricks and waste oil, 59404.

SOILS:

Drainage: Importance of (91).
Valley lines should be entirely kept open and given free outlet (91).
Kallar soil: deep cultivation necessary: use of tractors, 59386-8.
Reclamation of land should be encouraged by temporary remission of assessment (91), 59431-3.

STATISTICS:

Baluchistan mountains, rainfall statistics necessary (90).
Improvement in, necessary (94).

MUSTO, A. A.—contd.

STATISTICS—*contd.*

should be Published in more intelligible and interesting form (94).

TARIFFS AND SEA FREIGHTS :

Custom duties on agricultural implements and machinery might be removed (93).
Director General of Stores, London, Co-operative supplies might be shipped by (93).
Sea freight : too high (93).

WATERLOGGING :

Cause, often blockage of valley lines (91).
Lloyd Barrage system will suffer from if drainage is not attended to, 59400.

WELFARE OF RURAL POPULATION :

Gardens round houses necessary (92).
Horticultural shows would be beneficial (92).
Surveys, economic, in typical villages : useful if information is properly applied (94).
Town-planning necessary (92).
Trees should be planted in village by public bodies (92).

PANCHAYATS :

should Arbitrate in disputes as to holdings, *Shahani* (203).
Organisation has disappeared under stress of western democratic ideas, *Shahani*, 60615-7.
Taccavi, should assist in distribution of, *Shahani* (201).

POSTS AND TELEGRAPH, *see under* **ADMINISTRATION.**

POULTRY, *see under* **AGRICULTURAL INDUSTRIES.**

PROPAGANDA, *see under* **DEMONSTRATION AND PROPAGANDA.**

PUBLIC HEALTH, *see under* **WELFARE OF RURAL POPULATION.**

PUNJAB LAND ALIENATION ACT, *see under* **AGRICULTURAL INDEBTEDNESS.**

QUININE, *see under* **WELFARE OF RURAL POPULATION.**

RAHMAN, KHAN BAHADUR GULMAHOMED ABDUR, Acting Deputy Director of Agriculture, Sind (139-65).
Qualifications and experience, 59900-4, 60022-5.

ADMINISTRATION :

Meteorological Department : weather forecasts circulated, would be appreciated (142).
Transport :
Railways : should be Extended in rural tracts (142) ; Feeder lines necessary for marketing of wheat, 60086-90 ; fairly Satisfactory (142).
Roads : Insufficient and unsatisfactory (142-3) ; Marketing : lack of roads prevents provision of chain of markets for rice (148) ; and adversely affects marketing of wheat, 60086-90.
Steamers, fairly satisfactory (142).

AGRICULTURAL DEPARTMENT :

Staff :
Demonstration and propaganda, insufficient for (142), 59947 ; Requirements when Lloyd Barrage is working, 60140-1 ; Statistics, insufficient for (149).

AGRICULTURAL INDEBTEDNESS :

Causes of borrowing : poverty, accumulation of interest upon interest, low yield, cultivation expenses, illiteracy and ignorance of account (143), 60134-6 ; bondage to usurer, precarious inundation, social customs (143).

RAHMAN, K. B. GULMAHOMED ABDUR—contd.

AGRICULTURAL INDEBTEDNESS—*contd.*

Measures for lightening agriculture's burden of debt: compulsory primary education and cheap credit (143), 60134-6.
Repayment prevented by: Crop failures due to poor or late inundation or pests, mortgage of produce to bania and his extortions (143).
Sources of credit: co-operative societies, taccavi, village *bania* (143).

AGRICULTURAL INDUSTRIES:

Bee-keeping: climatic conditions do not favour (147).
Fruit growing: prevented by cultivator having no permanent interest in the holding and unfavourable conditions of water supply (147).
Health conditions, devotion of spare time to improving: travelling health officers should lecture on hygiene (147).
Industrial concerns, establishment of, in rural areas: ginning factories and rice hulling mills established near rural areas and absorb some spare labour; small flour mills might be opened in wheat growing tracts (147).
Lac culture: some scope for; practised wherever necessary material is available (147).
Leisure period: Where both rabi and kharif cultivation is possible, cultivator works all the year round; where kharif only is possible, he has 6 months' work; in the slack season he takes holidays at fairs, etc., does carting, canal clearance, building labour, tends livestock; Lloyd Barrage will lead to sufficient employment in agricultural operations all the year round (147); work for 8 to 10 months in Upper Sind Frontier under bosi system of cultivation, 60121-8.
Pisciculture: no scope for, as large quantity of fish available naturally (147).
Poultry rearing: done on a limited scale (147).
Rope-making: some scope for; practised wherever necessary material is available (147).
Scope for: not much, because haris do not lack employment, 60125.
Sericulture: Climatic conditions do not favour (147).
Weaving: prejudice against, 60127.

AGRICULTURAL LABOUR:

Attracting labour: under Barrage grants of land should be made (147-8).
Cheap labour an obstacle in adoption of heavy machinery and labour-saving appliances (146).
Haris: *See under* **LAND TENURE.**
Population: Sparse (147); Sufficient for present needs of cultivation; no surplus (148).
Shortage expected when Barrage is completed; labour saving implements will be necessary, 60129-30.

ANIMAL HUSBANDRY:

Bhagnari cattle: Bred in the north of Sind (146); should have Central breeding farm at Jacobabad (146); purely Draught (146); bred for Military transport, not suitable for agricultural purposes, 60010.
Bulls should be issued gratis from Government cattle stations to important villages (147).
Cattle breeding:
stud Bulls in Government institutions, free access to, 60064; Central station for each breed essential (146); Export demand, 60059-60; Immediate attention needed as cattle are the only motive power (146); Lack of knowledge, 60063; does not Pay except near towns where milk can be sold, 60058-61; Quality: in interior of Sind cattle all nondescript and poor (146), 60006-7; System unsatisfactory (146).
Castration, practice of, must be introduced (146), 60019-21.
Dual purpose cattle, advocated, 60166-7.
Fodder:
Bajri grown, 60171; Berseem: has been tried (145); no prospects for until cold weather water supply; would solve fodder supply to a great extent, 60056-7; Dry, is sold; cattle are fed during the busy season and starved during the remainder of the year (147); Green, insufficient during hot weather (146); shortage seriously

RAHMAN, K. B. GULMAHOMED ABDUR—contd.

ANIMAL HUSBANDRY—*contd.*

affects milk supply from December to July (147); Storage: not necessary, 60131-2; not stored in silos but in heaps, 60172-3.
Grazing:
"Huri" grants should be made by Government for growing babul trees and natural grasses, to be managed by the villagers co-operatively (147).
Insufficient owing to non-cultivation and inadequate irrigation facilities (146).
Karachi or Red-Sindhi cattle:
Bulls; a farm for supplying pedigree bulls exists (146); thrive in Japan, etc., 60168-70; Purity; the only definitely pure type, 60015-7; Quality: recognised as the best milk-producing cow in India (146); Small in size and number, 60008-9.
Shows, cattle, should be held in each taluka (147).
Thar Parkar or Dhatti cattle:
Dual purpose (146); not Pure bred, all mixed, 60017-8, 60174-5; Reared in Thar Parkar desert (146); Size medium, 60008; breeding Station to supply draught advocated (146), 60174-5; Number small, 60008-9.

CAPITAL, ATTRACTING OF, TO AGRICULTURE:

Improvements of land: discouraged by want of capital (149); Long term credit at low interest necessary (149); Lloyd Barrage: will attract capital (149); Obstacles: dullness of country life and precarious seasons (149).

CO-OPERATION:

Credit societies: number has increased very greatly in the last few years (148).
Farming, joint, society:
of Educated young men, on Lloyd Barrage land, might be tried, 60118.
of Haris, worth while trying as an experiment, 60103-4.
Fertilisers distributed through societies, 60156-62.
Non-credit societies: with few exceptions, not organised (148).
Non-officials; more effective than Government in spreading movement (148); command more confidence; are coming forward, 60069-70.
Tractor-leasing societies: 60115-9.

CROPS AND CROP PROTECTION:

Cotton:
Baker-Lane scheme does not provide for much cotton cultivation under Lloyd Barrage, 60179.
Egyptian:
Cultivated under Fletcher for nearly 5 years, 59998-9, 60002-4.
Experiments abandoned except at Sakrand renewed with fresh seed from Egypt, 60000, 60041-6.
Failed on Jamrao, after showing Promise of success, for lack of early water supply (145), 60000-1.
Punjab F. 4: (American):
Qualities: has proved to be healthy and prolific, fitting in with present conditions of water supply and possibly other environmental conditions; popular (145), 59983.
Quantity: 36,000 acres on Jamrao Canal 1926-27 (145).
Staple, medium, $\frac{6}{8}$ inch; superior staple strain should be evolved (145), 59983-7.

27 W. N.:
Quality superior to deshi and is being distributed (144); type, 60005.
Food crops; 81 per cent of total cropped area; percentage will increase under Baker-Lane Scheme under Lloyd Barrage; not much cotton cultivation, 60177-9.
Important crops: cotton, wheat, rice and juar (144).
Output: 23 per cent decrease and distinct decrease in cropped area in Karachi; thought to be due to insufficient water supply, 60038-40.
Potato seed imported from Italy, Kalka and Farukhabad; imported disease has not arisen (145).
Rice: selection of local and foreign varieties and hybridisation (144-5).
Seed distribution, particulars regarding (145), 60051-5.

RAHMAN, K. B. GULMAHOMED ABDUR—contd.

CROPS AND CROP PROTECTION—*contd.*

Seed improvement: by selection, isolation of superior strains and maintenance by pure line culture (144) 60153-5.
Wheat:
Improvement of local wheats (144); Introduction of Pusa 12 c and Punjab 11 (144); Pusa 12 being grown on 50,000 acres; is being extended; difficulty, lack of steady water supply; cultivator convinced of benefit (144), 60047-50.

CULTIVATION:

Bosi system: in Upper Sind Frontier; land flooded in September and wheat grown without further irrigation: provides work for 8 to 10 months in the year, 60124-4.
Dry-cultivation (without irrigation) impossible in Sind except desert portion of Thar Parkar and part of Karachi District, 59911-8.
Interculturing cotton by plough, thus saving labour (145).
Mixture of seeds when sowing not generally adopted in Sind, but mixed juar, bajri, maize and til sprinkled in cotton to supply early fodder for working cattle (145).
Ploughing, dry, long before sowing season, to aerate and enrich the soil, is practised in some tracts as a result of departmental demonstration (145).
Rotation:
Experiments carried on, until Jamrao perennial water supply failed; being carried out at Sakrand under Barrage conditions, 60065-6.
not Necessary at present as irrigation facilities only allow one-third of the land to be cultivated per annum; but under improved irrigation a good rotation must be devised (145).

DEMONSTRATION AND PROPAGANDA:

on Cultivators' own holdings, advocated (141), 59948, 59963, 60153-5.
Decorations awarded at district Durbars (142).
Farms, departmental:
on the Batai system, the department taking one-third produce on lift irrigation and one-half on flow, 59959-60; 400 or 500 acres cultivated for multiplying seed by haris on a commercial basis, with no special advantages beyond those arising from better seed and cultivation and advances without interest, 59947-58.
Jamesabad and Nawabshah sub-stations, managed on zamindari lines (142).
Landlords, wield considerable influence, and must be influenced to make improvements (141).
Leaflets, periodical publication of, advocated, though not very effective among illiterate cultivators (142).
increased Price of 12 annas to Re. 1 per maund for improved seed, for which there is a very active demand, 59947-67.
Shows, agricultural, held (142).
Staff:
Insufficient: Importance of personality; number of Scholarships increased under new development scheme (142), 59947, 60163-5.

EDUCATION:

Account-keeping, importance of teaching (140).
Agricultural:
Bias schools:
Agriculture only taught in higher standards, boys aged 13 to 18, 59933-5.
Control: local boards have administrative control but agricultural department lays out farms and visits in an advisory capacity, 59929-31.
few sons of Cultivators, boys have no idea of taking up agriculture, 59936-8.
Farm of about an acre attached to each; some buy or hire bullocks, 3 agricultural lessons of 1½ hours each per week, 59939-41.
Number: six in an experimental stage (139), (148).
not working Satisfactorily because not the right type of boy, 59942, 60151-2.
Schoolmasters trained for 6 months at Lyallpur, 59931.
Careers of students: Government service (139-40).
Students: mainly sons of landless haris (139-40).

RAHMAN, K. B. GULMAHOMED ABDUR—contd.

EDUCATION—*contd.*

Agricultural College for Sind: demand for, from certain sections, townspeople and a few zamindars; not necessary because not sufficient jobs for students when leaving, 60071-5, 60105-8.

Committee of 1920 on, Report (140-1).

Compulsory primary education: advocated, to protect cultivators from extortion of moneylenders, (143) 60134-6.

English: should be taught; boys cannot be kept on the land by refusing to teach them English, 59944-6.

Haris: little use in establishing agricultural schools for sons of (140-1); should not be admitted to zamindari schools, 60149-50.

Mirpurkhas Agricultural School: particulars regarding, (139), 59919-28, 60032-7, 60151-2.

Mullas' agricultural schools recommended (141), 60136.

Scheme for agricultural school, (140-1), 59988-9, 59992-7, 60036-7, 60075-6, 60149-50.

FERTILISERS:

Artificial: for wheat, sugarcane, etc., distributed through a private firm and co-operative societies, 60156-62.

Cowdung, use of, as fuel, and recommendations to prevent, (144).

Fallow system, taking a crop every 3 years, has obviated great use of manure (144).

Kalar soil: saline efflorescence applied to cotton fields (144).

Need of, only with intensive cultivation (144), under irrigation, 60156-62.

Silt from canal banks applied to cotton fields (144).

Village, old sites, mounds used in cotton tract (144).

FINANCE (*see also under*) **CAPITAL.**)

Taccavi:

Cultivators would be induced to make fuller use of by: reducing interest to that paid by Government to public *plus* cost of establishment; fully meeting demands of cultivators; distribution by senior and vigilant officers (143) 60137.

in Jamrao tract implements advanced as taccavi (141).

HOLDINGS, Fragmentation of: Inheritance law mainly responsible for, should be amended; Minimum area should be prescribed by law (143).

IMPLEMENTS:

Archimedian hand screw: on the market and being used to some extent (141).

Labour-saving implements: will be necessary after Lloyd Barrage is completed as there will be shortage of labour, 60129-30.

List of implements being brought to the notice of the agriculturists (146).

Obstacle: cheap labour and hari system (145-6).

Ploughs:

Egyptian (145), Meston (141) (145); Sarkar (141).

Ploughing zamindari lands on hire system, to train haris in use of improved implements (142).

Quality and variety very poor (145).

Tractors:

Cultivation costs, 59968-70, 60109-10.

Department recently rented out a tractor, 60115-16.

Difficulty owing to smallness of plots under irrigation rules and undergrowth, 59970.

Educated young men holding land co-operatively might use tractors, 60117-9.

Efficiency of, 60111-4.

RAHMAN, K. B. GULMAHOMED ABDUR—contd.

IRRIGATION :

Distribution : should be entrusted to a board of representatives of zamindars, Agricultural and Irrigation Departments, 60138-9.
Non-barrage area, loans, taccavi or co-operative, necessary to encourage development of wells (144) 60067-8.

LAND TENURE :

Fruit growing : prevented by cultivator having no permanent interest in the holding (147).
Haris (tenants) :
haris Co-operative farming society worth while trying as an experiment, 60103-4.
Education : *see under* that title.
Numbers : by far the largest class of agriculturists (141).
Share of produce : value of, under normal conditions, 60142-8.
Status : entirely dependent upon landlords for agricultural requisites and maintenance (141) ; are landless ; not very desirable state of things, 60077-8.
Suggestions : land could be given to intelligent haris, but not to all. Jamrao colonisation scheme with Punjabis has been successful, but Sindhi haris are indolent and different from Punjabis, experiment along the lines of the Jamrao suggested under Lloyd Barrage ; danger of depriving zamindars of supply of labour, 60077-85, 60101-2.

LLOYD BARRAGE :

Agricultural Department : staff will have to be increased, 60140-1.
Capital : will be attracted by Barrage (149).
Colonisation:
by Communities might be tried, 60120.
Haris : *see under* Land Tenure.
large Syndicates and possibly co-operative societies of educated young men should be given grants of land, 60117-9.
Cotton : Baker Lane Scheme does not provide for much cultivation, 60179.
Employment : will lead to sufficient, in agricultural operations all the year round (147).
Food Crops : percentage of total cropped area will be increased under Baker-Lane Scheme, 60177-9.
Labour :
Grants of land should be made to attract (147-8).
Labour-saving Implements will be necessary as there will be labour shortage, 60129-30.

MARKETING :

Cotton :
Adulterated with leaves, dry bolls and water ; no premium paid for purity by trade who themselves adulterate ; legislation necessary, 60094-100.
Ginning factories give reasonable conveniences to growers ; their brokers arrange sales on growers' estates, supply gunnies, and arrange forward sales (148).
Facilities :
existence of Ginning factories of responsible firms guarantees fair values being obtained (148).
no regular Markets in the sense in which they exist elsewhere ; but there are trade markets which are adequate for *bona fide* transactions where zamindar is not in debt (148).
Grading and packing :
requires serious Attention (148) ; Legislation necessary (148) ; grading should be Standardised (148).
Information, marketing, should be put at disposal of cultivators, etc. 148).
Rice : *see under* **MARKETING.**
Wheat : *see under* **MARKETING.**
Transport : *see under* **ADMINISTRATION.**

RAHMAN, K. B. GULMAHOMED ABDUR—contd.

RESEARCH:

Mirpurkhas Farm: Cotton breeder appointed in 1922 (139).
Plan of experiments: drawn up by committee consisting of Director of Agriculture, Botanist or Cotton Breeder and Acting Deputy Director, 60026-8.
Sakrand Research Station, to study post Barrage problems: Baker-Lane Scheme of 81 per cent intensity of cropping; water requirements of crops; effects on the soil of perennial irrigation (139); rotation (145) 60065-6, 59905-10, 60029-31.
Stations, two more required in Indus Right Bank area and Eastern Nara tract (139); not immediately necessary, 60176.

SOILS: Alkali lands reclaimed at Sukkur and Doulatpur by surface drainage and then continual cropping (144).

STATISTICS: Agricultural Department should do; additional staff necessary; at present statistics are not accurate and are published too late (149) 59982.

TALUKA DEVELOPMENT ASSOCIATION: Seed distribution: of very great help (157).

VETERINARY: Department should be under Director of Agriculture (146) 60133.

RAILWAYS, *see under* TRANSPORT *under* **ADMINISTRATION.**

RASAI, *see* BURDENS *under* **LAND TENURE.**

RECLAMATION, land, *see under* **SOILS.**

RESEARCH:

on Agricultural problems arising out of irrigation; need for provincial, co-ordinated by Inspector General of Irrigation who should be re-appointed *Musto*, 59425-7.

CENTRAL AND STATION:

should not be Controlled by Provinces, *Harrison*, 58817-8.
services of Experts should be pooled, *Shahani* (201).
should be Financed from central fund, *Harrison*, 58819-20, 58854-7.
should undertake Fundamental research, *Harrison*, 58812-5.
should be confined to Higher research, *Shahani* (198), (200-1) 60664.
Scientific staff should be increased and Indianised as far as possible, *Shahani* (201).
Scope: to assist provincial research and demonstration, *Harrison* (11-2); and for irrigation research, *Harrison*, 58716-22, 58854-7, 58782-3.
Crops: Governmen devotes undue attention to export crops such as cotton and wheat as compared with attention given to crops consumed in India such as paddy, bajri and juar, *Shewakram* (221) 60733-4, 60800-2, 60874-7.
Demonstration should be separate from research, *Harrison* (10) (12).
Departments of Agriculture and Irrigation should work together, *Harrison* (10) (12).
Diversity of conditions necessitating many kinds of research, *Bhutto* (65).
Enquiry necessary as to backward state agriculturally of Upper Sind Frontier district (166).
Expenditure on research may make future remissions of taxation unnecessary (184).
Fertilisers, artificial: research insufficient, *Shahani* (204).
Finance of, *Karachi Indian Merchants' Association*, 60347-9, 60472-3.
Hedge plant, quick growing, should be evolved, to protect crops from straying cattle, *Karachi Indian Merchants' Association* (184), 60518-9.
Hydraulic experiments: could be carried on at Sukkur; research officer should be appointed to investigate purely irrigation hydraulic problems, *Musto*, 59424.
Implements, *Bhutto*, 59164.
Indigenous methods should be studied; should be starting points for gradual improvemen, *Harrison* (10).
Kallar land, research required into factors producing, *Bhutto* (65).

RESEARCH—contd.

LARKANA :

Central station for Lloyd Barrage Right Bank Canals ; rice and bosi wheat area, with annual cropping, *Mann*, 58631-4 ; farm has been in existence since 1906 ; will be extended, *Mann*, 58660-1.
will take two years to get research for Right Bank into full working order, *Mann*, 58665-6 ; running expenses estimated at 1 lakh, *Mann*, 58676-9.
Water supply from Ghar canal ; tube wells will also be constructed, *Mann*, 58660-3.
Lift irrigation, by pumping, should be investigated, *Dow* (37-8).

MIRPURKHAS FARM :

Cotton breeder appointed in 1922, *Rahman* (139).
Experiment with Egyptian cotton, a failure mainly because of defective marketing, *Dow*, 59008-9.
Pests, research required, *Bhutto* (65), *Karachi Indian Merchants' Association* (184) 60518.
Plan of experiments : drawn up by committee consisting of Director of Agriculture, Botanist or Cotton Breeder and Acting Deputy Director, *Rahman*, 60026-8.
Poverty of cultivators prevents use being made of results of research, *Bhutto*, 59140, 59154-5, 59219-21.
Provincial :
should be better Financed, *Shahani* (198), (200-1).
should be confined to Local problems, *Shahani* (198), (200-1).
Provincial stations : Bombay Presidency, two required : Deccan and Sind, *Harrison* (12), 58771-3, 58812 ; would investigate local problems, *Harrison*, 58812.
Rats, research required as to, *Bhutto* (65), *Shahani* (204).

RICE :

Research required as to ; some Work being done but nothing substantial, *Shewakram*, (221), 60874-6.

SAKRAND RESEARCH STATION :

Agricultural Department doing all the work, *Harrison*, 58767-70, 58807-9, 58821, 58838-9.
Control should be by an officer permanently in Sind and not from Poona, *Dow*, 58957 ; Director of Agriculture with an advisory board suggested, *Karachi Indian Merchants' Association* (182) 60373-4.
Experimenting on watering, seeds, kallar, rotation, etc., *Karachi Indian Merchants' Association*, 60516-7.
Finance :
Central Cotton Committee contributing Rs. 20,000 a year for soil research, *Mann*, 58652-3.
Cost being met from current revenues and not from Lloyd Barrage loan, though the station is not revenue-producing, *Dow*, 59119-21, 59014.
Kallar : experiments to be conducted under Barrage conditions, *Dow*, 59010-1.
Poona, should be entirely separate from, *Harrison*, 58906.
Progress : at work nearly two years ; in a position to give a great deal of useful advice ; results of experiments will apply to right bank area except central rice canal, *Dow*, 59015-20.
Propaganda, now more important than research as to best varieties, *Dow*, 59012.
Scope : established as representing left Bank Rohri Canal area, the largest section, with sub-stations to work out results, *Mann*, 58629-31 ; a cotton area with one cropping in three years, *Mann*, 58629-40.
Soil deterioration due to irrigation, study of, not far advanced, *Dow*, 58960.
Staff : will have three first-class research officers, of whom one will be whole-time Director, *Mann*, 58629-40 ; botanist engaged on cotton, wheat and juar, *Mann*, 58652-3.
to Study post Barrage problems : Baker Lane Seheme of 81 per cent intensity of cropping ; water requirements of crops ; effects on the soil of perennial irrigation, *Rahman* (139) ; rotation *Rahman* (145) 60065-6, 59905-10, 60029-31.
Sufficient probably for general purposes, *Dow*, 58958-9.
Water : tube well constructed, *Mann*, 58663-4.

RESEARCH—contd.

Scholarships offered by Government of India for higher research, number should be greater, *Shahani* (198).
Sind : peculiar conditions : separate research station required, *Harrison* (12) 58906.
Skilled workers : great need of, *Khoso* (166).
Soil deterioration as a consequence of irrigation : importance and urgency of research, *Dow*, 58960-93.

STATION :

should be Directed by Director of Agriculture assisted by an advisory board representing agriculturists, etc., *Karachi Indian Merchants' Association* (182), 60373-4.
with Permanent endowment, needed in Sind, *Karachi Indian Merchants' Association* (181).
Sakrand probably a suitable site, *Karachi Indian Merchants' Association*, 60350-1.

STATIONS PROPOSED :

Central station for Nara Valley, representing Eastern Sind, *Mann*, 58629-40 ; no research stations other than Sakrand and Larkana to be started next year, *Mann*, 58665.
Two more required in Indus Right Bank area and Eastern Nara tract, *Rahman* (139) ; not immediately necessary, *Rahman*, 60176.
Success, lack of, in many cases, *Bhutto* (65).
Veterinary, *see under* that heading.

RICE, *see under* **CROPS AND CROP PROTECTION, MARKETING, SOILS, RESEARCH** *and* **IRRIGATION.**

RINDERPEST, *see* Rinderpest and Inoculation *under* **VETERINARY.**

ROADS, *see under* TRANSPORT *under* **ADMINISTRATION.**

ROTATION, *see under* **CULTIVATION.**

SHAHANI, S. C., M.A., Zamindar, Jamrao, Sind, Principal, D. J. Sind College, and Secretary, Sind Collegiate Board (198-220) ;
out of 4,000 acres only able to Crop 600 or 700 acres ; cultivates by haris and 150 acres himself by hired labour, 60625-30.
successfully Experimented in American, Egyptian and desi cotton and wheat, 60601-8, 60536-7.
his land is situated on Jamrao Canal and suffers from insufficiency of water, 60538-9.
Staff : has 14 salaried supervisors, whom he trains himself, 60634-6.
Students of Sind College not attracted as amenities sought by educated people are not available, 60637-43.
unable to grow Wheat because water is not available in October ; has grown various wheats, 60631-3.

ADMINISTRATION :

Co-ordination : by inter-provincial conferences and interchange of bulletins (200-1).
Meteorological Department : unsatisfactory ; needs development (201).
Posts and Telegraphs :
Generally fairly satisfactory ; charges should be reduced (201).
Wireless : unsatisfactory ; needs considerable development (201).
Transport :
Facilities, necessary for introduction of improved agricultural implements (204).
Railways :
Freights should be reduced (201), (204).
fairly Satisfactory (201).
Roads : unsatisfactory ; a metalled road within 2 miles of every village (201).
Steamers : fairly satisfactory.

SHAHANI, S. C.—contd.

AGRICULTURAL DEPARTMENT :

Education, agricultural : should be administered by (199).
Services :
better Organisation called for in personnel, demonstration and propaganda (201).
fairly Satisfactory (201).
refuse to Utilise experience of practical cultivators, 60606-10, 60673-4.

AGRICULTURAL INDEBTEDNESS :

Causes of borrowing : for improvements owing to lack of surplus ; for ordinary operations owing to inadequacy of water, wrong methods of cultivation, high taxation, ceremonial expenses, Deccan Agriculturists' Relief Act, etc., dishonesty, improvidence due to lack of education, physical inefficiency due to bad housing and lack of hospitals (202).
Deccan Agriculturists' Relief Act :
Co-operative movement : village moneylender should be corrected by, and organisations such as the Taluka Development Associations, 60708-11.
causes Dishonesty and indebtedness (202) 60660-2
Leads to moneylender insisting on receiving a sale deed instead of a mortgage, 60678-83.
Haris : *See under* that heading.
Interest : is really insurance against risk, 60564.
Measures for lightening agriculture's burden of debt : improvement of water supply, better training, laws calling for exact accounts from moneylenders but not interfering with collection of legitimate debts, provision of credit on easy terms (202).
Mortgages, non-terminable, should not be made ; hereditary cultivator's should be maintained (202) 60580, 60656-9, 60694-5.
Protective measures : apt to shake cultivator's credit and should be avoided (202) 60564-5.
Punjab Land Alienation Act :
a Bad measure ; will divide Hindus and Mohammedans and will kill the small holder, 60704-7.
will prevent Sellers obtaining market price for land and will cause land to accumulate in a few hands, 60712-20.
Repayment prevented by : inadequate yield and dishonesty (202).
Restricted Tenure Act : has reduced credit of agriculturists, 60567.
Restriction or control of credit of cultivators inadvisable (202) 60566-70.
Sources of credit : zamindar, sowcar, Government and co-operative societies (202).
Usurious Loans Act : danger of shaking cultivator's credit (202) 60567.

AGRICULTURAL INDUSTRIES : Recommended, basket making, cotton ginning, ghee-making, oil pressing, poultry rearing, rice hulling, rope making, spinning, sugar making, weaving, but cultivator should not neglect cultivation (205) 60675.
Government aid advocated (205) 60676-7.
Leisure period : cultivating cotton, 6 months ; cultivating cereals, longer leisure period than cotton ; cultivating on perennial irrigation, 4 months (205).
Obstacles : lack of agricultural education, funds and transport (205).
Sericulture : profitable at Bangalore (204).

ANIMAL HUSBANDRY :

Berseem : should be largely introduced (204).
Bulls, required, 60611-2.
Cattle-breeding : no special arrangements made for, 60611-4.
Fodder shortage :
Bajri and juari should be grown for fodder, 60588-9 ; greatest between October and July (204) ; better Water supply necessary (204).
Horses, stud, not available, 60609.
Pastures, common in villages :
Disappearing owing to encroachments for cultivation ; restoration would encourage Ghee-making (204) 60584.
Equilibrium between cultivator and pasture has been lost, 60584-9.

SHAHANI, S. C.—contd.

ARBITRATION :

of disputes through panchayats and communities, advocated (203).

CENTRAL COTTON COMMITTEE :

unsatisfactory ; no criticism allowed ; exclusion of best men, 60553-5, 60673-4.

CO-OPERATION :

Cotton ginning and marketing societies advocated (205).
Credit societies : should be developed to supply all needs of cultivators for short term credit (201).
Joint farming societies advocated to prevent excessive fragmentation of holdings (202).

CROPS AND CROP PROTECTION :

Cereals, selection of seeds of selected varieties, recommended (204).

Cotton :
Acala, American the best variety ; being grown at Sakrand Farm, 60562-3 ; further experiment necessary, 60618-24.
American (and Egyptian) long staple : water supply in February or March necessary ; profitable (204) ; American 285 better than F 4, 60541.
Egyptian : Metaffifi and Abbasi, better than American, but takes 7 to 8 months to ripen ; given up for lack of early water supply to enable crop to ripen before October ; has yielded 16 maunds per acre, 60556-9.
Fruit, in Quetta, profitable (204).
Legumes : hybridisation recommended (204).
Rats : research as to ratbane necessary (204).
Seed distribution : difficulty of obtaining good seed ; useless to approach Agricultural Department, 60606-8.
Wild animals, damage by : pigs should be shot (204).

CULTIVATION :

Ploughing, early and repeated, and aeration, recommended (200) (204) 60602, 60675.

DEMONSTRATION AND PROPAGANDA :

Cinema, advocated (200).
Cultivators, selected, should be used for (200) 60603-5.
on Cultivators' own fields, advocated (200).
Demonstrators : autocratic and snobbish behaviour of (200) 60673-4.
Reclamation of alkali land at Dowlatpur minor, a signal failure (200).
Successful measures : example of superior cultivator ; breaking up land several times ; seed selection and distribution (*see under* **CROPS AND CROP PROTECTION**), demonstration on cultivators' own fields ; bulletins issued by Agricultural Department in the vernacular ; exhibitions and shows (199-200).

EDUCATION :

Administration : of agricultural education should be by Agricultural Department (199).
Adult : can be popularised by being free and demonstrations that agriculture can be made to pay (199).
Agricultural :
Attendance : insufficient, due to : disappointment in not obtaining Government appointments ; distance of Poona Agricultural College ; training not sufficiently practical ; insufficient scholarships (198).
Careers of students : Government service, rarely cultivation of their own lands (199).
College, first grade, for Sind, advocated, 60727-8.

SHAHANI, S. C.—contd.

EDUCATION—contd.

Curricula : agriculture should be an optional subject in Intermediate science and arts degrees ; greater stress should be laid on agricultural practice (199) 60581-3.
Demand, may be stimulated by : demonstration that scientific agriculture is more paying ; revision of ideals ; reservation of tahsildarships for agriculturally trained applicants ; grants of land to educated agricultural communities ; scholarships, etc. (198).
Institutions insufficient (198).
Pupils not solely drawn from agricultural classes (199).
Subsidiary industries hampered by lack of (205).
Teachers : in rural areas should be drawn from agricultural classes (198).
Teaching facilities, urgent need for extension of (198).
Cinema : advocated (199).
Finance : by Local Governments with compulsory cesses levied on large landholders (199) 60670-2.
Indebtedness : caused by lack of, (202).
Intermediate Agricultural Colleges, advocated ; to teach agriculture, rural economics, agricultural chemistry, etc., 60542-5 ; at Karachi, Nawabshah and Sukkur, 60727-8.
Middle class youths, can be attracted to agriculture by : restricting appointments in Agricultural, Forest and Revenue Services mainly to such men when agriculturally trained ; grants of land, demonstration that agriculture can be made profitable (199) are deterred by lack of amenities on the land, sought by educated people, 60636-43 ; lack of land and water, 60684-93, 60727-8.
Moral training essential, 60663.
Nature study : advocated (199).
School farms and plots : advocated (199).
Sind, D. J. College : no agricultural teaching, 60542, 60665-7.
Technical knowledge : very few movements for improving (199).

FERTILISERS, suggestions (203-4).

FINANCE :

Land mortgage banks, at least one in each district, for long term credit (201).
Taccavi : village Panchayats should assist in its distribution and the system should be less rigid (201).

HARIS :

Indebtedness : Mahomedan zamindars lose on advances made to haris who abscond without repaying, 60572-9.
Welfare : are under mujeris who are under zamindars, 60625-30 ; relations with zamindars are very good ; many zamindars treat haris well ; zamindars who misbehave should be dispossessed by committees of villages, taluka organisations, etc. ; excessively large holdings should be prohibited ; status of haris should be improved ; should not be quite tenants-at-will, 60696-703 ; taluka development and similar associations recommended ; Deccan Agriculturists' Relief Act has made haris more dishonest, 60708-11, has not known one zamindar who has improved the housing or educational conditions of his haris, 60726.

HOLDINGS :

Fragmentation : would be reduced by : co-operative farming, fixing a standard unit for holdings, small holdings being sold to neighbours (202).
Legislation to deal with minors, widows, etc., necessary (203).
Obstacles to consolidation (202-3).
Large holdings : should not be permitted to be excessively large, 60702-3.

IMPLEMENTS :

Tractors : recommended ; transport facilities necessary to hasten adoption of improved implements (204).

SHAHANI, S. C.—contd.

IRRIGATION :

Distribution :
Internal distribution in holdings should be left to holders (203).
Modules recommended, if properly worked, 60721-5.
should be made Uniform (203).
Wastage of water through superabundant supply at tail of canals (203).
Jamrao Canal : Designed to be perennial ; Head should be improved ; Research into conditions for successful working necessary (203), 60537-40.
Kotri : weir should be constructed at (203).
Sub-soil water : research necessary to prevent waterlogging, 60540.
Tanks and ponds : for storage for winter crops (203).
Wells, tube : advocated where sub soil is sweet (203) 60540-1.

LLOYD BARRAGE :

Waterlogging : danger of, if careful drainage not introduced (203).

MARKETING :

Co-operative ginning and marketing advocated (205).
Cotton : unsatisfactory (205) ; small quantity of long staple offered for sale, 60560-2.
Information : should be given to cultivators, etc. (205).
Quality and grading : names of distributors (205) (208) 60546-52.

MUJERIS : (Managing cultivators) : hold land under zamindars, which they let to haris, 60629-30.

PANCHAYATS :

should Arbitrate in disputes as to holdings (203).
Organisation has disappeared under stress of western democratic ideas, 60615-7.
Taccavi, should assist in distribution of, (201).

RESEARCH :

Central :
services of Experts should be pooled (201).
should be confined to Higher research (198), (200-1) 60664.
Scientific staff should be increased and Indianised as far as possible (201).
Fertilisers, artificial : research insufficient (204).
Provincial :
should be better Financed (198), (200-1).
should be confined to Local problems (198), (200-1).
Ratbane : research necessary as to (204).
Scholarships offered by Government of India for higher research, number should be greater (198).

SOILS :

Alkali lands : reclaimed by profuse waterings, by rice and by fertilisers (203).
Drainage, essential (203).
Reclamation : land gone out of cultivation should be granted free (203).

TALUKA DEVELOPMENT ASSOCIATIONS, ETC. :

Committees should be supplemented by nomination ; problem of obtaining right type of men to form development committees, 60590-600.
will act as a Corrective to the village moneylender, 60708-9.
Government has discouraged formation of non-official organisations, 60644-55.
should be Non-official ; officials should consult, 60541.
Organisation : should be associated with village committees, and should be combined by divisions, district and province, 60541.

SHAHANI, S. C.—concld.

VETERINARY DEPARTMENT :

does not Assist when epidemics break out ; does not desire Interchange of ideas with cultivators, 60609-10 ; not Satisfactory (201).

WATERLOGGING :

Research as to subsoil water necessary, 60540.

WELFARE OF RURAL POPULATION :

Communal dissension ; caused by Punjab Land Alienation Act, 60704-7 ; is an obstacle to measures for, 60642.
Dispensaries necessary in villages, 60663.

SAKRAND RESEARCH STATION, *see under* **RESEARCH.**

SEEDS, *see under* **CROPS AND CROP PROTECTION.**

SHEWAKRAM, Rao Sahib UDHARAM, Zamindar, Guni, District Hyderabad (221-45).
Cultivates through haris ; no home farm, 60729-32.
his land will not benefit by Lloyd Barrage, 60839.
almost entirely Rice cultivation, 60841.

ADMINISTRATION :

Meteorological Department : insufficient publicity (222).
Posts and Telegraphs :
Postal :
Delivery in rural tracts should be free of additional unauthorised charges (222) 60784-6.
Facilities unsatisfactory (222).
village Schoolmaster could be put in charge, 60787-99.
Telephones : facilities should be placed at disposal of zamindars at nominal charges for obtaining marketing information, etc. (222).
Transport :
Communications : great importance of improvement, 60742.
Railways : feeder lines required (222).
Roads :
extremely Bad (222), 60767.
Cess has been increased from 4 to 5 pice and cannot be further increased, 60772-73, 60829-40.
Improved roads would lead to increased motor revenue, part of which should go to the Provincial Government, 60842-4.
Provincial grants necessary (222).

AGRICULTURAL DEPARTMENT :

Services : unsatisfactory ; Staff : insufficient and inexpert (222).

AGRICULTURAL INDEBTEDNESS :

Extravagance : not a fault of zamindars, 60845.
Irrigation : assured perennial flow would solve problem (224).

AGRICULTURAL INDUSTRIES :

Paper manufacture from rice straw in Lower Sind, would be a very useful supplementary industry (232).

ANIMAL HUSBANDRY :

Bulls :
Ignorance of Government premium bull system, 60881-2.
should be Supplied to zamindars free of cost to improve breeds of draught cattle (231).
Dairies, private, should be encouraged by subsidies, grants of land, etc., to qualified men (231).

SHEWAKRAM, R. S. UDHARAM—contd.

ANIMAL HUSBANDRY—*contd.*

Fodder shortage, in Lower Sind, greatest in May and June ; green fodder available from August (232).
Pastures :
Scarcity of, owing to lack of water and greed of zamindars who utilise all available land for cultivation (231).
every Village should be compulsorily supplied with 20 to 50 acres of common pasture land irrigated free (231).

CAPITAL, ATTRACTING OF, TO AGRICULTURE :

Demonstration of improved methods by capitalists (232).
Hereditary landowners : policy of favouring and of discouraging newcomers with capital, criticised (232), 60823-8.
Improvement of land discouraged by : ignorance, conservative habits, want of enterprise, fatalism, lack of capital, etc. (232-3).
Waste land, grant of, at nominal prices or payment by instalment, to individual capitalists or companies, with facilities for constructing canals, advocated (232).

CROPS AND CROP PROTECTION : Rice :

Enquiry as to outturn advocated (221), 60803-5.

DEMONSTRATION AND PROPAGANDA :

on Cultivators' own fields, by comparative plots, recommended (221).

EDUCATION :

Agricultural :
Attendance :
school Hours should be in the afternoon and from 8 to 10 o'clock at night (221), 60735-41, 60845.
lack of Interest of parents due to agriculture not being taught and labour of children being required (221).
in several areas very Thin (221).
Institutions, insufficient (221).
Scholarships for boys advocated (221).
Teachers :
should be Drawn, if possible from agricultural classes (221).
Supply insufficient (221).
Teaching facilities, are absent in agricultural districts (221).
Curricula : agriculture should be taught in all primary classes (221) 60778-83.
Finance : additional land revenue of 1 anna in the rupee, earmarked for agricultural education, advocated (221).

FINANCE :

Haris, indebtedness of : *see under* that heading.
Land mortgage banks :
Advocated (222) ; would not lead to Extravagance, which is not a fault of zamindars, 60846, 60872-3.
Taccavi : criticism of system (222).

HARIS :

Indebtedness :
in Bad seasons zamindars are forced to take cattle of haris in payment and incur losses, 60847.
zamindars should be financed at 6 per cent and should be bound to finance their haris at 9 per cent (222) ; zamindars charge their haris from 12 to 25 per cent, 60847 ; and banias charge 25 to 30 per cent (222).

IMPLEMENTS :

Ploughs, iron, being used in Guni Taluka, 60878-80.

SHEWAKRAM, R. S. UDHARAM—contd.

IRRIGATION :

Alkali lands : in Lower Sind, could be reclaimed by abundant canal silted water (232).
Capitalists : should be afforded facilities for constructing canals (232).
Distribution : present methods cause great difficulties (227-8). (*See under* MODULES *below.*)
Drainage : *see under* SOILS.
Extension, very great, advocated (223-4).
Finance : almost all irrigation works pay adequate interest (224).
Fuleli canal :
present Distribution system is reducing outlets and throwing land out of cultivation (227).
water supply of, for winter crops will be cut off by Lloyd Barrage, with ruinous results (223).
the only existing Perennial canal in Sind (223).
Gaja canal system : supply insufficient and should be supplemented by canal construction (223) 60848.
Haig, Colonel, Settlement Officer : letter of 1873 as to inadequate expenditure on clearance and maintenance of canals (225).
Hakabo (water rate) :
Expenditure is being diverted from silt clearance to building bungalows, etc., for comfort of officers, 60897-902. (*See under* SILT CLEARANCE *below.*)
in Guni Taluka from 1893 to 1920 3·5 to 4 per cent. spent on clearance whereas 16 per cent ought to have been spent (225-6); table of figures as to Guni Taluka (234); accuracy of figures questioned, 60883-96.
Levied per acre to keep Government canals in efficient order (224-7).
undertaking was as to Maintenance of canals, which in Sind means silt clearance, 60849-57.
was Merged in land revenue (224-7).
Government is therefore under an Obligation to spend a proportionate percentage of land revenue on clearance and improvement of canals, but has not done so (224-7).
Replaced forced labour (224-7).
Importance of :
Assured perennial flow supply would solve problems of cultivators (223-4).
Kotri Barrage :
would enable Alkali lands to be reclaimed (229).
would Diminish expenditure on silt clearance (227).
would remedy Fodder shortage (231).
Necessary (223).
should Precede introduction of modules (228).
Mehrani Canal :
Early construction advocated (223).
Sanctioned, estimates and plans before Government (223).
Modules :
Assessment : new assessment necessary before introduction of, 60861-71.
Distribution : formerly tail got less than head ; now with modules tail gets more than head (228), 60756-9, 60858-60.
should be Preceded by regulators securing constant level and discharge (228).
have Reduced discharge and water levels (228).
Successful from point of view of engineers (228).
Non-barrage zone : effect of Lloyd Barrage on :
land will go out of Cultivation and loss will amount to crores (223).
Flow land will become lift (223).
Fuleli winter supply will be cut off rendering winter crops impossible (223).
Kotri barrage necessary (223).
Lloyd Barrage should be constructed but resulting hardship should be provided for, 60748-55.
Supply of inundation water will be shortened by 40 days at critical seasons, with ruinous results (223).
Pastures should be supplied free (231).
Rice cultivation : Department's wrong policy of restricting (229-30) 60746-7.

SHEWAKRAM, R. S. UDHARAM—contd.

IRRIGATION—*contd.*

Silt clearance of canals :
widespread Complaints of zamindars (224-7).
Figures showing decrease in area cultivated (224-7) 60743-5 ; figures showing percentage of revenue spent on clearance (234) ; accuracy of figures questioned, 60883-96.
Forced labour for canal clearance was replaced by *hakabo* (*see under* that heading above), (224-7).
letter 1873, of Colonel Haig, Settlement Officer (225).
letter of Sir H. E. M. James, Commissioner (226).
report of Colonel Lambert, Collector of Karachi (225).
report 1874, of Colonel Merewether, Commissioner (224-5).
Obligation of Government to spend definite proportion of land revenue on clearance and improvement of canals has been forgotten (224-7).
petition (1925) of Zamindars Association, Tando division (224-5).

MARKETING :

Information : Telephone facilities should be placed at disposal of zamindars at nominal charges (222).

RESEARCH :

Crops : Government devotes undue attention to export crops such as cotton and wheat as compared with attention given to crops consumed in India such as paddy, bajri and juar (221) 60733-4, 60809-2, 60874-7.

SOILS :

Alkali land :
a Great deal in Lower Sind could be rendered cultivable by abundant canal silted water (229) 60761-4 ; and rice cultivation (229).
Instance of land becoming alkaline through lack of drainage (230-1).
mostly above Level of flow water at present and kotri barrage should be built to facilitate reclamation of, (229).
Drainage :
Cultivation : lack of, prevents enrichment of rice soil by cultivation of winter pulse (230).
Floods in lower Sind, due to lack of, (228-9).
Instance of lack of, causing land to become alkaline (230-1), 60760.
additional Revenue of 4 annas per acre suggested to provide drainage (228-9). 60817-9.
Yield of rice decreasing owing to lack of, 60811-3.
Rice :
Advantages :
little Capital required (229-30).
Continuous cultivation without manure (229-30).
with Drainage soil can be enriched by cultivation of winter pulse (229-30).
Malaria can be prevented by drainage (229-30).
can be grown in Marshes, etc., where no other crop can be grown (229-30).
Output is doubled if stagnant water is drained at intervals (229-30).
greater net Profit than any other cereal crop (229-30).
lack of Drainage on land continuously cultivated with rice in Lower Sind has led to waterlogging (228).
Irrigation and Revenue Departments look upon rice with undeserved disfavour because it consumes nearly twice as much water as dry crops and causes malaria (229-30), 60746-7.
Red rice more effective, 60765.
Silt :
Alkali land can be reclaimed by (229).
Inundation canals lay rich deposit on flow lands, 60761-4.

TALUKA DEVELOPMENT ASSOCIATIONS : advocated, 60806-10.

SHEWAKRAM, R. S. UDHARAM—contd.

VETERINARY :

Department : unsatisfactory ; staff insufficient (222).

WATERLOGGING : *see under* SOILS *above.*

WELFARE OF RURAL POPULATION :

Drinking water supply :
Village receives no grant (237).
Wells : during 7 or 8 months in the year, when canals are dry, sole supply from wells which are often brackish, 60820-2.
Malaria :
Due to lack of Drainage in Lower Sind (228-9).
Sanitation : local boards contribute to village sanitary boards, 60774-5.

SOILS :

ALKALI land : (also *see under* **LLOYD BARRAGE).**
Instance of land becoming alkaline through lack of drainage, *Shewakram* (230-1).
Kotri barrage should be built, to facilitate reclamation of, *Shewakram* (229).
mostly above Level of flow water, *Shewakram* (229).
Reclamation by :
Babul growing, Harrison (14) 58751-2, 58772-7.
Drainage, *Bhutto* (69), *Rahman* (144), *Shahani* (203), *Shewakram* (230-1).
Fertilisers, *Shahani* (203).
Hardy Crops, *Harrison* (14) 58751-2, 58772-7, *Rahman* (144).
Leaching, *Harrison* (14) 58751-2, 58772-7.
Rice cultivation, *Harrison* (14) 58751-2, 58772-7, *Shahani* (203), *Shewakram* (229).
Silt, *Shewakram* (229) 60761-4.
Waterings, *Bhutto* (69), *Shahani* (203), *Shewakram* (229) 60761-4.
Daulatpur reclamation scheme, failure of, *Dow* (36).
Deterioration as a consequence of irrigation : importance and urgency of research, *Dow,* 58960-93.

DRAINAGE :

Floods in Lower Sind, due to lack of, *Shewakram* (228-9).
Importance of in Sind, *Harrison* (14) 58737-45, *Musto* (91), *Shahani* (203).
Instance of lack of, causing land to become alkaline, *Shewakram* (230-1) 60760.
Lack of, prevents enrichment of rice soil by cultivation of winter pulse, *Shewakram* (230).
Removal of choking acuatic growth by dragline excavators mounted on caterpillars, *Harrison* (14) 58746-50.
additional Revenue of 4 annas per acre suggested to provide drainage, *Shewakram* (228-9), 60817-9.
Valley lines should be entirely kept open and given free outlet, *Musto* (91).
Yield of rice decreasing, *Shewakram,* 60811-3.

EROSION :
Indus floods cannot be stemmed by afforestation, owing to force of river and friable soil, *Aitchison* (175), *Bhutto* (69).
cannot be Prevented by afforestation anywhere in Sind, *Aitchison,* 60296.
not generally Serious in Sind, *Harrison* (15).
Government should not attempt improvement of, *Bhutto* (69).
Green mulches : extensive use of, advocated, *Harrison* (14).
Improvement : in Jacobabad by increasing water supply, *Khoso* (167).
Kalar soil : deep cultivation necessary : tractors, *Musto,* 59386-8.

RECLAMATION : (*see also under* ALKALI *above*).

Assessment, temporary remission recommended, *Musto* (91) 59431-3.
Grants of land recommended, *Bhutto* (69), *Shahani* (203).

SILT :

Alkali land can be reclaimed by, *Shewakram* (229).
Inundation canals lay rich deposit on flow lands, *Shewakram,* 60761-4.

STATISTICS :

Agricultural Department should do ; additional staff necessary ; at present statistics are not accurate and are published too late, *Rahman* (149) 59982.
Baluchistan mountains, rainfall statistics necessary, *Musto* (90).
Crop yield : figures unreliable ; method of collection must be revised ; indirect method of collection quite unreliable, *Dow* (40) 58986-8.
Division of produce between zamindars and haris, revenue officers should be present at and keep accounts of, *Hussain* (133).
Haris : statistics as to proportion of membership of co-operative societies desirable, *Azimkhan*, 59674-7 (*See under* **LAND TENURE**).
Implements, *see below* : " Livestock and Implements ".
Improvement necessary, *Musto* (94).
often Invented, owing to pressure of work, *Bhutto* (74).
Livestock and implements : figures suspected to be quite unreliable : concentration over a limited area suggested, *Dow* (40) ; figures collected every 5 years ; village accountant sends in his return to the taluka head-quarters ; staff ill-paid and heavily worked, *Dow*, 59084-95.
should be Published in more intelligible and interesting form, *Musto* (94).
Sufficient at present, *Bhutto* (74).
Yield estimates, not satisfactory, *Hussain* (133).

SUKKUR BARRAGE, *see* **LLOYD BARRAGE.**

TACCAVI, *see under* **FINANCE.**

TALUKA DEVELOPMENT ASSOCIATIONS, etc. :

Advocated, *Karachi Indian Merchants' Association*, 60509, *Shewakram*, 60806-10.
Agricultural propaganda : have done a great deal of work ; should be left to them entirely, *Hussain* (129) (132), *Azimkhan* (103-4) 59523.
Animal husbandry : do not take part in, *Azimkhan*, 59529-32, 59804.
Committees should be supplemented by nomination ; problem of obtaining right type of men to form development committees, *Shahani*, 60590-600.
Co-operation : play an important part in developing, *Azimkhan* (108) ; are registered as non-credit co-operative societies, *Azimkhan*, 59515-20, 59524, 59563.
Controlled by executive committee, *Azimkhan* (103).
will act as a Corrective to the village moneylender, *Shahani*, 60708-9.
Cultivation of comparative plots, *Azimkhan* (104).
Demonstrators maintained, *Azimkhan* (103-4), 59515-21.
Depôts of seeds and implements for sale and hire maintained, *Azimkhan* (103), 59515.

FINANCE :

Funds sufficient, *Azimkhan*, 59569-71 ; need more funds, *Dow* (36) ; Government will have to supply funds, *Dow*, 59025-6, *Hussain* (129).
Government subsidy equal to expenditure up to Rs. 1,000, *Azimkhan*, 59522, 59569-71 ; some not drawing the full Government subsidy, *Azimkhan*, 59646-52.
Members, ordinary pay Re. 1 or Rs. 2, life members Rs. 25, and patrons Rs. 200, *Azimkhan*, 59522.
Government has discouraged formation of non-official organisations, *Shahani*, 60644-55.
Jacobabad District : no association, *Khoso* (174) 60271-2.
Management : Managing Committee elected by general body of members, one man one vote ; haris have the same vote as zamindars, *Azimkhan*, 59564-8.
should be Non-official ; official should consult, *Shahani*, 60541.
Ploughs : have done much to improve, *Hussain* (132).
Programme of work framed with advice of Agricultural Department, *Azimkhan* (103).
Progress : capable of doing good work, need more funds, danger of falling into bad hands, *Dow* (36) 58964-5, founded about 4 years ago, *Azimkhan*, 59533-4.
Organisation : should be associated with village committees, and should be combined by divisions, districts and province, *Shahani*, 60541.
Propaganda, best media for, *Azimkhan* (103-4), 59523, *Hussain* (129) (132).
Quinine, distributed by, *Azimkhan*, 59521.
Seed, distributed by, *Azimkhan*, 59515-6, 59819, *Rahman* (157).
Self-help, have developed a spirit of *Azimkhan*, 59569.
one Sufficient for each taluka, *Azimkhan*, 59614-23, 59802-9.
consist of Zamindars, co-operators, *Azimkhan* (103) 59566.

TARIFFS AND SEA FREIGHTS :

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Director General of Stores, London, co-operative supplies might be shipped by, *Musto* (93).
Sea freights : too high, *Musto* (93).

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USAR LAND, *see* ALKALI *under* **SOILS.**

USURIOUS LOANS ACT, *see under* **AGRICULTURAL INDEBTEDNESS.**

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CONTAGIOUS DISEASES :

Legislation beneficial, but difficult to enforce and expensive, *Jerrom* (85) 59326-7.
Obstacles to dealing with : ignorance ; not promptly reported, *Jerrom* (85) 59330 ; objection to inoculation or slaughter ; cattle coming from Indian States, *Jerrom* (85) 59327.

DEPARTMENT :

does not Assist when epidemics break out, *Shahani*, 60609-10.
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should be Independent, *Jerrom* (85) 59311.
Minister of Agriculture, might be in charge of, but should have Veterinary officer as its departmental head *Jerrom*, 59328-9.
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Officials should attend at peasants' farms, *Karachi Indian Merchants' Association* (183).
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system not satisfactory, *Jerrom* (85) ; owing to joint control, *Jerrom*, 59323-4.
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Extension necessary, but prevented by lack of funds, *Jerrom* (85) 59345.
Extension taking place, *Bhutto* (71).
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CAUSES :

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Cultivation methods largely, *Harrison* (14) 58803-6.
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Propaganda recommended, *Hussain* (132), *Karachi Indian Merchants' Association* (184).
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MALARIA : (*See also* Quinine *below*).

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Quinine :
Propaganda as to use of necessary, *Azimkhan* (106).
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Refuse disposal : propaganda necessary, *Azimkhan* (106).
Sanitation : local boards contribute to village sanitary boards, *Shewakram*, 60774-5; propaganda advocated, *Hussain* (133), *Azimkhan* (106).

SURVEYS, ECONOMIC, in typical villages :

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Government cannot afford to undertake the work, *Dow* (39-40).
Information must be properly applied, *Musto* (94).
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Useful, *Dow* (39-40), *Musto* (94), *Karachi Indian Merchants' Association* ; not very helpful, *Bhutto* (73).
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Wells, *see* Drinking water, *above*.

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GLOSSARY.

Abadgar	A cultivator.
Abkalani	The season during which water is available for irrigation.
Afrin-nama	A certificate.
Babul	A common tree (*acacia arabica*).
Bahan	A large deciduous tree (*populus euphratica*).
Bajri (Bajra)	A small millet (*pennisetum typhoideum*).
Bandara	A dam.
Bandi	An account book.
Bania	A Hindu trader who is generally also a moneylender.
Batai	Division of the crop between the cultivator and the landlord.
Bawa	A Hindu ascetic.
Berseem	Egyptian clover (*trifolium alexandrinum*).
Bosi	Land on which a crop is grown after it has been flooded from an inundation canal.
Bund	A dam; a field embankment.
Deh	A village with the lands belonging to it.
Deshi (Desi)	Native to the country; indigenous.
Dhand	A lake.
Dhoro	A depression.
Divana	Madman.
Divani	The civil court.
Dubari	Double cropping.
Eksali	Leased for one year.
Fakir	A Muhammadan ascetic.
Ghi	Clarified butter.
Guar	Field vetch (*cyamopsis psoralioides*).
Gur	Unrefined Indian sugar, jaggery.
Haccaba (Hakabo)	Water rate; (the term is usually confined to the water rate charged to *jagirdars* who do not pay any land revenue).
Hari	A peasant.
Huri	A tree plantation or reserve.
Jagir	An assignment of the revenue of a given area of land.
Jagirdar	The holder of any assignment of revenue.
Jambho	An oil-seed (*eruca sativus*).
Jerabe (Jireb)	A varying measure of land, roughly half an acre.
Jowar (juar) / Jowari (juari)	The large millet (*sorghum vulgare*).
Kabuli	An agreement, as applied to Government fields taken up for cultivation.
Kalar (Kallar)	Saline efflorescence.
Kamgar	A petty offier.
Kandi	A thorny tree (*prosopis spicigera*).
Karia	A water channel.
Katcha	Low alluvial land; soil resulting from recent inundation.
Kharif	The autumn harvest; crops sown in the beginning of the rains and reaped in October-December.
Khatedar	A holder of land.
Kuran	The Muhammadan Scripture.
Lakh	One hundred thousand.
Lapo	An illegal exaction by officials making revenue collections.

Lar . . . . Lower Sind, south of Hyderabad.

Mah (Mung) . . Green gram (*phaseolus mungo*).
Maistri . . . A petty officer.
Malkana (Malkano) . Occupancy price.
Maund . . . A measure of weight which varies in different places.
Matar . . . Chickling vetch (*lathyrus sativus*).
Mofussil . . . The country as opposed to the town.
Mohag . . . The indefinite right of a landholder to land adjacent to his holding.
Mujeri . . . A managing cultivator.
Mukhtiarkar . . Revenue officer in charge of a *taluka*.
Mulla . . . A Muhammadan religious preacher.

Nar . . . . A Persian wheel.

Panchari . . . Grazing fee.
Panchayat . . . Literally, a committee of five; a popular jury; a committee of arbitrators.
Panchsali . . . Leased for five years.
Pathari . . . A gang; also a place where cattle-dealers or lifters reside.
Rhutti . . . A cotton pod.
Pucca . . . Solid, firm, correct, complete, etc. (the contrast in all respects to *kutcha*).
Pun . . . . Elephant grass (*typha elephantina*).

Rabi . . . . The spring harvest; crops sown in the autumn and reaped at the end of the cold weather.
Rasai . . . An illegal exaction in the shape of supply of provisions.
Reh . . . . Land impregnated with sodium salts and thereby rendered barren.
Ryot . . . . A cultivator, a peasant proprietor.
Ryotwari . . . The system of tenure under which the land is held by the cultivator direct from Government.

Sarah (Sarhia) . . Rapeseed (*brassica campestris*).
Seer . . . . A weight of 2·057 lbs. avoirdupois.
Sethia . . . A moneyed man, who is either a trader or moneylender or both.
Sowcar . . . A moneylender.
Sudhar . . . Improvement.
Sudra . . . A man belonging to one of the lower castes.

Taccavi . . . An advance made by Government to cultivators for agricultural purposes.
Tahsildar . . . A revenue officer in charge of a *taluka*.
Tali . . . . Sissoo wood (*dalbergia sissoo*).
Taluka . . . A revenue division of a district.
Tapedar . . . A village accountant.
Thur . . . . Prickly pear; milk bush (*euphorbia tirucalli*).
Til . . . . An oil-seed (*sesamum indicum*).
Tuar . . . . Pigeon pea (*cajanus indicus*).

Urd . . . . A pulse (*phaseolus radiatus*).
Usar . . . . Land impregnated with sodium salts and thereby rendered barren.

Verandawalla . . Literally, one who sits on the veranda and does little or no work.

Zamindar . . . A landowner; a peasant proprietor.
Zamindari . . A property of a landholder.
Zabardast . . Powerful, oppressive.

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TERMS OF REFERENCE

Generally,

To examine and report on the present conditions of agriculture and rural economy in British India and to make recommendations for the improvement of agriculture and the promotion of the welfare and prosperity of the rural population;

In particular to investigate—

(*a*) the measures now being taken for the promotion of agricultural and veterinary research, experiment, demonstration and education, for the compilation of agricultural statistics, for the introduction of new and better crops and for improvement in agricultural practice, dairy farming and the breeding of stock;

(*b*) the existing methods of transport and marketing of agricultural produce and stock;

(*c*) the methods by which agricultural operations are financed and credit afforded to agriculturists;

(*d*) the main factors affecting rural prosperity and the welfare of the agricultural population;

and to make recommendations.

It will not be within the scope of the Commission's duties to make recommendations regarding the existing system of landownership and tenancy or of the assessment of land revenue and irrigation charges, or the existing division of functions between the Government of India and the local Governments. But the Commission shall be at liberty to suggest means whereby the activities of the Governments in India may best be co-ordinated and to indicate directions in which the Government of India may usefully supplement the activities of local Governments.

QUESTIONNAIRE

Part I

Question.

1. Research.
2. Agricultural Education.
3. Demonstration and Propaganda.
4. Administration.
5. Finance.
6. Agricultural Indebtedness.
7. Fragmentation of Holdings.

Part II

8. Irrigation.
9. Soils.
10. Fertilisers.
11. Crops.
12. Cultivation.
13. Crop Protection.
14. Implements.

Part III

15. Veterinary.
16. Animal Husbandry.

Part IV

17. Agricultural Industries.
18. Agricultural Labour.
19. Forests.
20. Marketing.
21. Tariffs and Sea Freights.
22. Co-operation.
23. General Education.
24. Attracting Capital.
25. Welfare of Rural Population.
26. Statistics.

QUESTIONNAIRE

Part I

1. Research.

(*a*) Have you suggestions to advance for the better organisation, administration and financing of—

(*i*) All research affecting the welfare of the agriculturist, including research into the scientific value of the indigenous theory and traditional methods of agriculture,

(*ii*) Veterinary research ?

(*b*) If in cases known to you progress is not being made because of the want of skilled workers, or field or laboratory facilities for study or by reason of any other handicaps, please give particulars. [Suggestions of a general kind should be made under (*a*) ; answers under this heading should relate to specific subjects. The purpose is to secure a list of the problems met with by scientific investigators in the course of their work which are being held over because of lack of resources or deficient organisation.]

(*c*) Can you suggest any particular subject for research not at present being investigated to which attention might usefully be turned ?

2. Agricultural Education.

With reference to any form of agricultural education of which you may have experience, please state your views on the following :—

(*i*) Is the supply of teachers and institutions sufficient ?

(*ii*) Is there an urgent need for extension of teaching facilities in any district or districts known to you personally ?

(*iii*) Should teachers in rural areas be drawn from the agricultural classes ?

(*iv*) Are the attendances at existing institutions as numerous as you would expect in present circumstances ; if not, state reasons. Can you suggest measures likely to stimulate the demand for instruction ?

(*v*) What are the main incentives which induce lads to study agriculture ?

(*vi*) Are pupils mainly drawn from the agricultural classes ?

(*vii*) Are there any modifications in existing courses of study which appear to be called for ; if so, what are they ?

(*viii*) What are your views upon (*a*) nature study ; (*b*) school plots ; (*c*) school farms ?

(*ix*) What are the careers of the majority of students who have studied agriculture ?

(*x*) How can agriculture be made attractive to middle class youths ?

(*xi*) Are there recent movements for improving the technical knowledge of students who have studied agriculture ?

(*xii*) How can adult education in rural tracts be popularised ?

(*xiii*) In suggesting any scheme for better educational facilities in rural areas, please give your views for (*a*) its administration and (*b*) its finance.

3. Demonstration and Propaganda.

(*a*) What are the measures which in your view have been successful in influencing and improving the practice of cultivators ?

(*b*) Can you make suggestions for increasing the effectiveness of field demonstrations ?

(*c*) Can you suggest methods whereby cultivators may be induced to adopt expert advice ?

(*d*) If you are aware of any striking instances of the success or the failure of demonstration and propaganda work, please give particulars and indicate the reasons for success or for failure.

4. Administration.

(*a*) Do you wish to suggest means towards the better co-ordination of the activities of the Governments in India or to indicate directions in which the Government of India may usefully supplement the activities of the local Governments ?

(*b*) Is it your opinion that the expert scientific knowledge required in the development of agriculture in the different Provinces could be supplied to a greater extent than is the case at present by increasing the scientific staff of the Government of India ? If so, indicate the types of work which would benefit by pooling the services of experts, and suggest how that work should be controlled.

(*c*) Are you satisfied from the agricultural standpoint with the services afforded by—

(*i*) The Agricultural and Veterinary Services,

(*ii*) Railways and steamers,

(*iii*) Roads,

(*iv*) Meteorological Department,

(*v*) Posts, and

(*vi*) Telegraphs, including wireless ?

If not, please indicate directions in which you think these Services might be improved or extended.

5. Finance.

(*a*) What are your views as to the steps that should be taken for the better financing of agricultural operations and for the provision of short and long-term credit to cultivators ?

(*b*) Do you wish to suggest means whereby cultivators may be induced to make fuller use of the Government system of *taccavi* ?

6. Agricultural Indebtedness.

(*a*) What in your opinion are :—

(*i*) the main causes of borrowing,

(*ii*) the sources of credit, and

(*iii*) the reasons preventing repayment.

(*b*) What measures in your opinion are necessary for lightening agriculture's burden of debt ? For example, should special measures be taken to deal with rural insolvency, to enforce the application of the Usurious Loans Act, or to facilitate the redemption of mortgages ?

(*c*) Should measures be taken to restrict or control the credit of cultivators such as limiting the right of mortgage and sale ? Should non-terminable mortgages be prohibited ?

7. Fragmentation of Holdings.

(*a*) Do you wish to suggest means for reducing the loss in agricultural efficiency attendant upon the excessive subdivision of holdings ?

(*b*) What are the obstacles in the way of consolidation and how can they be overcome ?

(*c*) Do you consider legislation to be necessary to deal with minors, widows with life interest, persons legally incapable, alienation and dissentients, and to keep disputes out of the courts ?

PART II

8. Irrigation.

(*a*) Name any district or districts in which you advocate the adoption of new irrigation schemes, or suggest extensions or improvements in the existing systems or methods of irrigation by—

(*i*) Perennial and non-perennial canals,
(*ii*) Tanks and ponds,
(*iii*) Wells.

What are the obstacles in your district or Province to the extension of irrigation by each of the above methods ?

(*b*) Are you satisfied with the existing methods of distributing canal water to cultivators ? Describe the methods that have been employed to prevent wastage of water by evaporation and by absorption in the soil. What form of outlet for distribution to cultivators at the tail end do you regard as the most equitable and economical ? Have these methods and devices been successful, or do you wish to suggest improvements ?

(*N.B.*—Irrigation charges are *not* within the terms of reference of the Commission, and should not be commented upon.)

9. Soils.

(*a*) Have you suggestions to make—

(*i*) for the improvement of soils, whether by drainage or other means, not dealt with under other headings in this questionnaire.
(*ii*) for the reclamation of Alkali (Usar) or other uncultivable land,
(*iii*) for the prevention of the erosion of the surface soil by flood water ?

(*b*) Can you give instances of soils known to you which, within your recollection, have—

(*i*) undergone marked improvement,
(*ii*) suffered marked deterioration ?

If so, please give full particulars.

(*c*) What measures should Government take to encourage the reclamation of areas of cultivable land which have gone out of cultivation ?

10. Fertilisers.

(*a*) In your opinion, could greater use be profitably made of natural manures or artificial fertilisers ? If so, please indicate the directions in which you think improvement possible.

(*b*) Can you suggest measures to prevent the fraudulent adulteration of fertilisers ?

(*c*) What methods would you employ to popularise new and improved fertilisers ?

(*d*) Mention any localities known to you in which a considerable increase in the use of manures has recently taken place.

(*e*) Has effect of manuring with phosphates, nitrates, sulphate of ammonia, and potash manures been sufficiently investigated ? If so, what is the result of such investigation ?

(*f*) What methods would you employ to discourage the practice of using cowdung as fuel ?

11. Crops.

(*a*) Please give your views on—

(*i*) the improvement of existing crops,

(*ii*) the introduction of new crops including fodder crops,

(*iii*) the distribution of seeds,

(*iv*) the prevention of damage by wild animals.

(*b*) Can you suggest any heavy yielding food crops in replacement of the present crops ?

(*c*) Any successful efforts in improving crops or substituting more profitable crops which have come under your own observation should be mentioned.

12. Cultivation.

Can you suggest improvements in—

(*i*) the existing system of tillage, or

(*ii*) the customary rotations or mixtures of the more important crops ?

13. Crop Protection, Internal and External.

Please give your views on—

(*i*) The efficacy and sufficiency of existing measures for protection of crops from external infection, pests and diseases.

(*ii*) The desirability of adopting internal measures against infection.

14. Implements.

(*a*) Have you any suggestion for the improvement of existing, or the introduction of new, agricultural implements and machinery ?

(*b*) What steps do you think may usefully be taken to hasten the adoption by the cultivator of improved implements ?

(*c*) Are there any difficulties which manufacturers have to contend with in the production of agricultural implements or their distribution for sale throughout the country ? If so, can you suggest means by which these difficulties may be removed ?

PART III

15. Veterinary.

(*a*) Should the Civil Veterinary Department be under the Director of Agriculture or should it be independent ?

(*b*) (*i*) Are dispensaries under the control of Local (District) Boards ? Does this system work well ?

(*ii*) Is the need for expansion being adequately met ?

(*iii*) Would you advocate the transfer of control to Provincial authority ?

(*c*) (*i*) Do agriculturists make full use of the veterinary dispensaries ? If not, can you suggest improvements to remedy this ?

(*ii*) Is full use made of touring dispensaries ?

(*d*) What are the obstacles met with in dealing with contagious diseases ? Do you advocate legislation dealing with notification, segregation, disposal of diseased carcases, compulsory inoculation of contacts and prohibition of the movement of animals exposed to infection ? Failing legislation, can you suggest other means of improving existing conditions ?

(*e*) Is there any difficulty in securing sufficient serum to meet the demand ?

(*f*) What are the obstacles in the way of popularising preventive inoculation ? Is any fee charged, and, if so, does this act as a deterrent ?

(*g*) Do you consider that the provision of further facilities for research into animal disease is desirable ?

If so, do you advocate that such further facilities should take the form of—

(*i*) an extension of the Muktesar Institute, or

(*ii*) the setting up, or extension of, Provincial Veterinary Research Institutions ?

(*h*) Do you recommend that special investigations should be conducted by—

(*i*) officers of the Muktesar Institute, or

(*ii*) research officers in the Provinces ?

(*i*) Do you recommend the appointment of a Superior Veterinary Officer with the Government of India ? What advantages do you expect would result from such an appointment ?

16. Animal Husbandry.

(*a*) Do you wish to make suggestions for—

(*i*) improving the breeds of livestock,

(*ii*) the betterment of the dairying industry,

(*iii*) improving existing practice in animal husbandry

(*b*) Comment on the following as causes of injury to cattle in your district—

(*i*) Overstocking of common pastures,

(*ii*) Absence of enclosed pastures, such as grass borders in tilled fields,

(*iii*) Insufficiency of dry fodder such as the straw of cereals or the stems and leaves of pulses,

(*iv*) Absence of green fodders in dry seasons,

(*v*) Absence of mineral constituents in fodder and feeding stuffs.

(*c*) Please mention the months of the year in which fodder shortage is most marked in your district. For how many weeks does scarcity of fodder usually exist ? After this period of scarcity ends how many weeks elapse before young growing cattle begin to thrive ?

(*d*) Can you suggest any practicable methods of improving or supplementing the fodder supply that would be applicable to your district ?

(*e*) How can landowners be induced to take a keener practical interest in these matters ?

Part IV

17. Agricultural Industries.

(*a*) Can you give any estimate of the number of days of work done by an average cultivator on his holding during the year ? What does he do in the slack season ?

(*b*) Can you suggest means for encouraging the adoption of subsidiary industries ? Can you suggest any new subsidiary industries to occupy the spare time of the family which could be established with Government aid ?

(*c*) What are the obstacles in the way of expansion of such industries as beekeeping, poultry rearing, fruit growing, sericulture, pisciculture, lac culture, rope making, basket making, etc. ?

(*d*) Do you think that Government should do more to establish industries connected with the preparation of agricultural produce for consumption, such as oil pressing, sugar making, cotton ginning, rice hulling, utilisation of wheat straw for card-board, utilisation of cotton seed for felt, fodder, oil and fuel, utilisation of rice straw for paper, etc. ?

(*e*) Could subsidiary employment be found by encouraging industrial concerns to move to rural areas ? Can you suggest methods ?

(*f*) Do you recommend a more intensive study of each rural industry in its technical, commercial and financial aspects, with a view to, among other things, introduction of improved tools and appliances ?

(*g*) Can you suggest any other measures which might lead to greater rural employment ?

(*h*) Can you suggest means whereby the people could be induced to devote their spare time to improving the health conditions of their own environment ?

18. Agricultural Labour.

(*a*) What measures, if any, should be taken to attract agricultural labour from areas in which there is a surplus to—

(*i*) areas under cultivation in which there is a shortage of such labour ? and

(*ii*) areas in which large tracts of cultivable land remain uncultivated ?

Please distinguish between suggestions designed to relieve seasonal unemployment and proposals for the permanent migration of agricultural population.

(*b*) If there is any shortage of agricultural labour in your Province, what are the causes thereof and how could they be removed ?

(*c*) Can you suggest measures designed to facilitate the occupation and development, by surplus agricultural labour, of areas not at present under cultivation ?

19. Forests.

(*a*) Do you consider that forest lands as such are at present being put to their fullest use for agricultural purposes ? For instance, are grazing facilities granted to the extent compatible with the proper preservation of forest areas ? If not, state the changes or developments in current practice which you consider advisable.

(*b*) Can you suggest means whereby the supply of firewood and fodder in rural areas may be increased ?

(*c*) Has deterioration of forests led to soil erosion ? What remedies would you suggest for erosion and damage from floods ?

(*d*) Can you indicate any methods by which supply of moisture in the soil, the rainfall and supply of canal water can be increased and regulated by afforestation or by the increased protection of forests so as to benefit agriculture ? Would the same methods be useful in preventing the destruction by erosion of agricultural land ?

(*e*) Is there an opening for schemes of afforestation in the neighbourhood of villages ?

(*f*) Are forests suffering deterioration from excessive grazing ? Is soil erosion being thereby facilitated ? Suggest remedies.

20. Marketing.

(*a*) Do you consider existing market facilities to be satisfactory ? Please specify and criticise the markets to which you refer, and make suggestions for their improvement.

(*b*) Are you satisfied with the existing system of marketing and distribution ? If not, please indicate the produce to which you refer and describe and criticise in detail the channels of marketing and distribution from the producer to the consumer in India (or exporter in the case of produce exported overseas). State the services rendered by each intermediary and whether such intermediary acts in the capacity of merchant or commission agent, and comment upon the efficiency of these services and the margins upon which such intermediaries operate. Please describe

the method by which each transaction is financed, or in the case of barter, by which an exchange is effected.

(*c*) Do you wish to suggest steps whereby the quality, purity, grading or packing of agricultural produce may be improved, distinguishing where possible between produce destined for—

(*i*) Indian markets ?

(*ii*) Export markets ?

(*d*) Do you think that more effective steps might be taken to place at the disposal of cultivators, merchants and traders information as to market conditions, whether Indian or overseas ; crop returns ; complaints as to Indian produce from wheresoever originating ; and agricultural and marketing news in general ?

21. Tariffs and Sea Freights.

Do existing (*a*) customs duties, both import and export, and (*b*) sea freights adversely affect the prosperity of the Indian cultivator ? If so, have you any recommendations to make ?

22. Co-operation.

(*a*) What steps do you think should be taken to encourage the growth of the co-operative movement—

(*i*) by Government,

(*ii*) by non-official agencies ?

(*b*) Have you any observations to make upon—

(*i*) Credit societies ;

(*ii*) Purchase societies ;

(*iii*) Societies formed for the sale of produce or stock ;

(*iv*) Societies for effecting improvements—*e.g.*, the digging of wells and the construction of bunds, walls and fences, or the planting of hedges ;

(*v*) Societies formed for the aggregation of fragmented holdings and their redistribution in plots of reasonable size ;

(*vi*) Societies for the co-operative use of agricultural machinery ;

(*vii*) Societies for joint farming ;

(*viii*) Cattle breeding societies ;

(*ix*) Societies formed for any purpose connected with agriculture or with the betterment of village life, but not specified above ?

(*c*) Where co-operative schemes for joint improvement, such as co-operative irrigation or co-operative fencing or a co-operative consolidation of holdings scheme, cannot be given effect to owing to the unwillingness of a small minority to join, do you think legislation should be introduced in order to compel such persons to join for the common benefit of all ?

(*d*) Do you consider that those societies of which you have personal knowledge have, in the main, achieved their object ?

23. General Education.

(*a*) Do you wish to make observations upon existing systems of education in their bearing upon the agricultural efficiency of the people ? If you make suggestions, please distinguish, as far as possible, between—

(*i*) Higher or collegiate,

(*ii*) Middle school, and

(*iii*) Elementary school education.

(*b*) (*i*) Can you suggest any methods whereby rural education may improve the ability and culture of agriculturists of all grades while retaining their interest in the land ?

(*ii*) What is your experience of compulsory education in rural areas ?

(*iii*) What is the explanation of the small proportion of boys in rural primary schools who pass through the fourth class ?

24. Attracting Capital.

(*a*) What steps are necessary in order to induce a larger number of men of capital and enterprise to take to agriculture ?

(*b*) What are the factors tending to discourage owners of agricultural land from carrying out improvements ?

25. Welfare of Rural Population.

(*a*) Outside the subjects enumerated above, have you any suggestions to offer for improving hygiene in rural areas and for the promotion of the general well-being and prosperity of the rural population ?

(*b*) Are you, for instance, in favour of Government conducting economic surveys in typical villages with a view to ascertaining the economic position of the cultivators ? If so, what, in your opinion, should be the scope and methods of such enquiries ?

(*c*) If you have carried out anything in the nature of such intensive enquiry, please state the broad conclusions which you reached.

26. Statistics.

(*a*) Do you wish to make suggestions for the extension or improvement of the existing methods of—

(*i*) ascertaining areas under cultivation and crops ;

(*ii*) estimating the yield of agricultural produce ;

(*iii*) enumerating livestock and implements ;

(*iv*) collecting information on land tenure, the incidence of land revenue and the size of the agricultural population ;

(*v*) arranging and publishing agricultural statistics ?

(*b*) Have you any other suggestions to make under this heading ?

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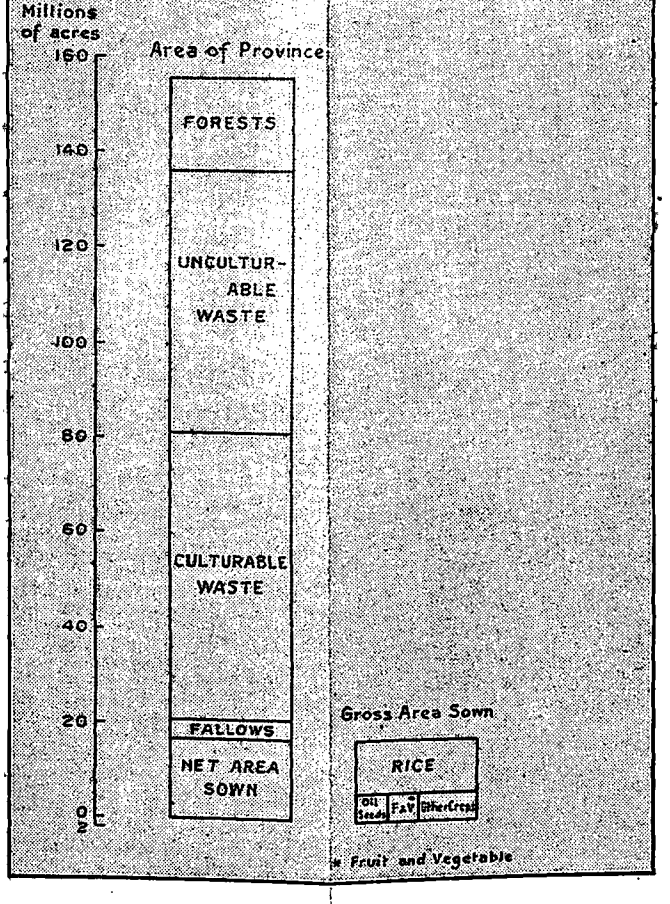
BURMA

CLASSIFICATION OF AREA AND AREA UNDER VARIOUS CROPS

(Averages for the 5 years 1921-22 to 1925-26)

Note:- *The difference between the Gross Area Sown and the Net Area Sown represents the area Sown more than once.*



BURMA

1. GENERAL FEATURES

Burma is the northern part of the Indo-Chinese Peninsula and the most easterly province of the Indian Empire. It comprises all the country enclosed by the eastern off-shoots of the Himalayas and the sea. In the northern part it consists of high mountains; towards the south these mountains open out into separate ranges enclosing river valleys, while along the sea border is a flat coastal strip. It is shut off from India on the north-west by a mass of densely forest-clad mountains ranged in steep and high ridges running nearly north and south and intersected by deep and narrow valleys inhabited by wild tribes. These mountains form a barrier which has kept the peoples of the two countries separate in race, language, religion and customs. Its total area is given in the census of India as 233,707 square miles and in area it is the largest province of the Indian Empire being more than twice the size of the United Provinces of Agra and Oudh; more than one-third larger than Madras; and nearly twice the size of Bombay. It lies between Assam on the north-west and China on the north-east and between the Bay of Bengal on the west and south-west and Siam on the south-east. Waterways form its main means of internal communication, while sea communications furnish the principal commercial link between Burma and the outside world, including the other provinces of the Indian Empire.

The main physical features of the province are its mountains and its rivers. The chief mountain ranges and their spurs run nearly north and south and make communication east and west difficult. The ranges gradually become lower as they run south and as they receive a bountiful rainfall they are plenteously covered with forest and other vegetation. The rivers of Burma are the key to its physical geography. They are three in number, the Irrawaddy, the Salween and the Sittang and flow from north to south parallel to the line of the mountain ranges. Their effect on the natural divisions of the country will be explained in the next chapter.

The rainfall varies greatly from tract to tract of the country and on the Arakan and Tenasserim coasts on which the monsoon coming across from Ceylon makes its first impact the annual rainfall averages over 200 inches. In the Irrawaddy delta the average is about 100 inches. Here the monsoon breaks, as a rule, early in May and continues till the end of September. In Central Burma, between the Arakan Yomas on the west and the Shan Hills on the east, conditions approximate somewhat to those of the Indian Deccan. The Arakan Yomas protect this tract from the south-west monsoon and there are often long breaks of rainless

weather in the monsoon season. The average rainfall is a little over 30 inches. This is the only part of Burma where scarcity is at all likely to occur. The water channels are dry except in the wet season and there is a great deal of island and river bank cultivation as the Irrawaddy subsides after the rains. North of the central dry tract lies the Upper Burma wet zone comprising the districts of Katha, Bhamo, Myitkyina and part of the Shan States. The rainfall here varies considerably and ranges from 50 to 100 inches.

As most of Burma lies in the tropics, the climate generally, except in the dry zone of Central Burma, is hot and damp. On the hills to the north and east it is more temperate but Burma usually escapes the extremes of heat and cold to which northern India is subject. The maximum temperature in Lower Burma seldom rises to 100°. In Central Burma, it may reach 110° to 115°, but this excessive heat is compensated for by cooler nights in the winter months. In the Shan States and the Chin and Kachin Hills the elevation gives a temperate climate, the thermometer seldom rising above 80° and in the colder months there is frost at night.

The agricultural practice of the country is almost entirely dictated by the rainfall and so much of the province has an assured and ample supply of rain that it is not surprising to find that rice dominates the agricultural energies of the country. Thus of the total occupied area in 1925-26 of 19,969,425 acres, 11,558,371 were under rice. The acreage under all other crops was 4,473,894 acres only, of which sesamum contributed 1,132,862 acres, beans 795,005 acres, millet 700,789 acres, groundnut 498,587 acres, cotton 449,168 acres and fruit gardens 370,840 acres. Minor crops are maize 199,388 acres, gram 118,166 acres and wheat 48,202 acres. The valuable crops, tobacco and rubber, occupied 83,665 and 79,222 acres respectively.

It is estimated that the culturable waste available is over 21 million acres, but this figure is purely conjectural.

As regards livestock, the supply of working bullocks would appear to have kept pace with the demand although prices have risen greatly in the last few years in sympathy with the rise of prices of other agricultural products. The last Season and Crop Report gives the number of working bullocks at 1,890,950, bulls 637,127, cows 1,391,797 and young stock 995,097. In Lower Burma and in the wet zone of Upper Burma, the buffalo is an animal of great agricultural importance and the figures for them are buffalo bulls and bullocks 364,530, buffalo cows 401,094, buffalo calves 672,024. Sheep are relatively unimportant and thrive only in the central dry zone. They number 73,871. Goats are numerous though they receive little attention and number 620,696. Pigs are kept by Karens and the hill tribes and amount to 371,170. Horses and ponies number only 84,353.

2. NATURAL DIVISIONS

The agriculture of Burma is determined almost entirely by considerations of rainfall and the province divides naturally into four main regions

or tracts. The first and most important of these is the Lower Burma wet tract which comprises the Arakan, Tenasserim and Pegu divisions with a rainfall varying from 80 to well over 200 inches. In this tract falls the rich delta of the Irrawaddy and a narrow strip of level land in Arakan and Tennasserim between the mountains and the sea. This is the great rice tract of the province — entirely rain-fed. The area under rice has increased as follows :—

	Acres
1896	5,451,541
1906	9,283,801
1916	10,070,250
1926	11,558,371

The export figures for the last ten years to India and elsewhere have been :—

Year	India	Elsewhere	Total
	Tons	Tons	Tons
1917	659,824	891,986	1,551,810
1918	487,148	1,314,744	1,801,892
1919	2,175,176	418,590	2,593,766
1920	1,342,856	724,212	2,067,068
1921	1,432,850	804,096	2,236,946
1922	1,050,313	1,493,308	2,543,621
1923	796,967	1,453,937	2,250,904
1924	692,737	1,811,356	2,504,093
1925	1,427,867	1,967,838	3,395,705
1926	1,041,713	1,861,982	2,903,695

Apart from rice, a certain amount of sugarcane is cultivated on the alluvial land along the banks of streams while most villages of importance have groves of mangoes or cocoanuts. Tenasserim has valuable gardens of the much-prized durian and mango-steen fruits peculiar to Burma and the Malay States. In Tenasserim also are found the principal rubber plantations.

The soil of the delta consists of old alluvium of great depth. On the ridges and foot-hills the soil is sandy or lateritic. Along the banks of the Irrawaddy and other rivers there are considerable stretches of

new alluvium on which such crops as beans and tobacco can be grown in the cold weather.

North of this wet alluvial tract lies the Upper Burma dry tract which occupies practically all the central belt of the country. In general appearance the country is undulating, consisting of low hills of tertiary formation. In Mandalay, and Kyankse, however, there are large tracts of level land under cultivation. The soils vary from stiff black clay on the lower grounds to light sands and gravels on the slopes and uplands. Where irrigation is available, rice is exclusively cultivated as also in the valleys where it is rain-fed. Where irrigation is not available, dry cultivation is engaged in, the principal crops being the millets, maize, cotton, sesamum, gram, beans and groundnut. The introduction of this last crop, largely through the agency of a government garden, has completely revolutionized the agriculture of the dry zone and in twenty years its cultivation has advanced from practically *nil* to 460,000 acres.

The Upper Burma wet zone comprises the northern districts of the province, Katha, Bhamo, Myitkyina, the Upper Chindwin and parts of the northern Shan States. Vast tracts of country are available for cultivation here. The sparsity of population, difficulties of labour and the unhealthiness of the tract are limiting factors. Paddy is cultivated in the lowlands and shifting cultivation on the hills. In Myitkyina, a serious attempt is being made to grow sugarcane on a factory basis.

The last tract is the Shan States, a federation of States under the Governor of Burma. This tract has great agricultural possibilities consisting as it does of a vast plateau extending from the eastern boundary of Burma to the Chinese frontier with an elevation of from 3,000 to 6,000 feet. Development is retarded however by lack of population and communications. Excellent potatoes are grown in the States while the wheat produced is of good quality.

The division between these climatic zones is not precise or definite and in them we come across areas of intermediate rainfall. For instance, between the Lower Burma wet tract and the central dry tract lies Pyinmana with a rainfall of from 50 to 80 inches where the best sugarcane in the province is cultivated. Cattle breeding is almost entirely confined to the dry zone and the Shan States, it being practically impossible to produce young stock in the wet tracts of Lower Burma or in the northern wet range. The cattle produced in the dry zone and in the Shan States are yearly driven down in huge droves for sale to the cultivators in the riverain tracts of Lower Burma.

3. PROVINCIAL INCOME AND EXPENDITURE

The receipts and disbursements of the Government of Burma from 1921-22 till 1925-26 are shown in the following statement. The figures call for little comment, but it may be noted that the provincial contribution, originally 64 lakhs, has been temporarily remitted and if this remission becomes permanent, an additional sum will be available for

the ordinary purposes of administration. From the point of view of agriculture and general rural uplift, the most interesting feature is the progressive expansion of expenditure on education, medical relief, public health, agriculture and industries.

GOVERNMENT OF
(Figures are in
Revenue and Expenditure

Receipt Heads	1921-22	1922-23	1923-24	1924-25	1925-26
Revenue Receipts					
Principal Heads of Revenue—					
Land Revenue	531	496	472	571	534
Excise	98	112	119	116	124
Stamps	49	50	58	62	67
Forest	221	183	178	182	210
Other heads	38	5	5	12	16
Railways	..	..	1	..	..
Irrigation	4	42	36	39	43
Debt Services—					
Interest	5	6	8	13	13
Civil Administration—					
Administration of Justice	7½	9	9	11	11
Jails and Convict Settlements	4½	4	4	4	5
Police	4½	6	6	9	5
Education	3	4	4	5	5
Medical	1½	2	2	2	2
Public Health	..	..	..	1	1
Agriculture	..	..	1	1	1
Industries	..	..	..	..	..
Other Departments	1	1	1	2	4
Civil Works	6	8	10	13	9
Miscellaneous	31	6	8	7	5
Miscellaneous Adjustments between Central and Provincial Governments	7	..	..	2	..
Extraordinary Receipts	..	..	..	..	9
Total, Revenue Receipts ..	1,012	934	922	1,052	1,064

BURMA

lakhs of rupees)

charged to Revenue

Expenditure Heads	1921-22	1922-23	1923-24	1924-25	1925-26
Expenditure charged to Revenue					
Direct Demands on the Revenue—					
Land Revenue	54	51	51	57	69
Forest	93	102	102	97	81
Other heads	18	22	21	22	34
Capital outlay of Forests (charged to Revenue)	..	..	..	..	8
Railways	37	65	−109	..	..
Irrigation Revenue expenditure ..	33	66	49	46	45
Irrigation (capital expenditure charged to Revenue)	9	9	7	8	24
Debt Interest	−14	−17	−13	−14	−14
Civil Administration—					
General Administration	84	92	95	106	101
Administration of Justice	43	49	55	59	62
Jails and Convict Settlements ..	24	26	30	27	29
Police	148	141	142	132	135
Ports and Pilotage	23	32	30	30	19
Education	59	67	73	79	97
Medical	31	33	34	36	38
Public Health	8	7	9	8	11
Agriculture	13	16	19	20	20
Industries	2	1	1	3	4
Other Departments	3	8	7	4	4
Civil Works	190	203	213	192	243
Miscellaneous	46	51	69	75	70
Provincial Contribution	64	64	64	64	44
Miscellaneous Adjustments between Central and Provincial Governments	30	2	..	2	1
Extraordinary charges	..	..	..	..	..
Total, Expenditure charged to Revenue ..	998	1,090	9,459	1,053	1,125

GOVERNMENT OF
(Figures are in
Capital Receipts

Receipt Heads	1921-22	1922-23	1923-24	1924-25	1925-26
Capital Receipts					
Revenue Surplus	14	..	..	..	..
Famine Insurance Fund	1	..	..	0½	0½
Loans and Advances by Provincial Governments	23	27	26	37	44
Total Capital Receipts ..	38	27	26	37½	44½
Opening Balance	572	585	368	304	279½
Total ..	610	612	394	341½	324

BURMA

lakhs of rupees)

and Expenditure

Expenditure Heads	1921-22	1922-23	1923-24	1924-25	1925-26
Capital Expenditure					
Revenue Deficit	..	156	27	1	61
Famine Insurance Fund	..	..	..	..	..
Loans and Advances by Provincial Governments	25	88	63	61	20
Total Capital Expenditure ..	25	244	90	62	81
Closing Balance	585	368	304	279¼	243
Total ..	610	612	394	341¼	324

4. REVENUE ADMINISTRATION AND LAND RECORDS

The tenure of agricultural land in Lower Burma is simple when compared with the variety of tenures found in other provinces. Briefly put, the ownership of land is regarded as vested in the State but by continuous possession for 12 years and the regular payment of revenue over that period, an occupant is given the status of a landholder. This gives him a permanent, heritable and transferable right of use and occupancy of his land, subject only to the payment of all such revenue tax, cesses and rates as may from time to time be imposed in respect of such land under any law for the time being in force and to the reservation to Government of all mines and mineral products and of all buried treasure. In order to establish his position as a landholder and to acquire a title deed as against the State, he is entitled to receive on application a landholder's certificate. Land may also be granted to cultivators for all time or by lease or given on licence for a specified period. Subject to the strict observance of the conditions attached to these grants and leases, the cultivator obtains a firm possession of his land as against Government or third parties. Where a cultivator has not obtained the status of a landholder or has not taken out a grant, licence or lease, he is a tenant-at-will of Government until he has attained twelve years of uninterrupted occupation and theoretically is liable to ejectment without compensation during these twelve years. This power of Government is only however used in cases where non-agriculturists have obtained possession of land. In Upper Burma land is divided into two categories, non-State and State. Non-State land was land in which the Burmese kings were understood to have recognised the existence of proprietary rights against the State. No rights against the State can be acquired on State land by occupation throughout a period of time or, as the regulation puts it, "an occupier of State land can have no heritable or transferable right of use or occupancy therein nor can any rights adverse to the Government exist in such land unless they have been created or continued by a grant made by or on behalf of the British Government." In the case of non-State land, a landholder has complete proprietary rights and is practically in the position of the person who has attained landholder's rights in Lower Burma. But rights to non-State land cannot be acquired in respect of land which was not declared non-State land when the tenure was decided after enquiry by Government. A consolidated land law applicable to Upper and Lower Burma is under consideration and will probably be introduced shortly in the form of a Bill in the Legislative Council.

Practically all occupied land in Burma has been cadastrally surveyed and mapped on a scale of 16 inches to the mile. Every field is surveyed in detail and the map is kept up to date by the local surveyors who are supposed to measure up new cultivation and mark other changes every year and bring the map up to date. This work is in the hands of the Land Records staff who maintain annually an accurate survey, a record of persons liable to assessment and an annual crop marking of all crops. The Land Records Department is a very strong one and

consists of revenue surveyors dealing with from 10,000 to 15,000 acres with inspectors, usually one to each township,* all working under the Superintendent of Land Records. The Superintendent of Land Records and his establishment is under the immediate control of the deputy commissioner who is responsible for the proper carrying out of all land records work. The whole department is under the control of the Commissioner of Settlements and Land Records.

Before land records, however, we have the settlement, which is not such an elaborate affair as it is in India. There is no settlement in the sense of an engagement made by a farmer to pay so much revenue in respect of so much land for such and such a period. The only things which are settled in Burma are rates of assessment and the period for which these rates are to be in force. The settlement officer in fact originally laid the foundation of all the revenue assessment and collection. He started off with a clean map provided by the Survey of India and entered the boundaries of every holding on the map. He then prepared a list of the persons in occupation of the land and proceeded to arrive at his assessment rates by crop cuttings to ascertain the fertility of the soil. On these results the land is divided into fertility classes. Enquiries into cost of production, the value of produce over a period of years and rents and mortgages are all recorded and he arrived at a theoretical rate on a proportion of the surplus left when the cost of production is subtracted from the average value of the produce. This theoretical rate, which Government claims as its right to take as revenue, is one-half of the net produce, but in point of fact this maximum is seldom, if ever, attained. Rents are only beginning to be a factor in the fixation of assessment rates though competition rents have always been taken into consideration. As a rule settlements are for twenty years at the end of which period the settlement is revised. Enhanced rates notified after revision settlement must not exceed the expired rates by more than thirt-three per cent during the first five years of the new settlement nor during the next five years exceed sixty-six per cent while allowance is made to cultivators who have incurred expenditure to improve their lands by the granting of exceptional and favourable terms. Assessment in Burma is a fluctuating assessment and separate rates are notified for separate assessment tracts within a district. Whenever waste land is brought under cultivation, the new area is measured up and assessed generally at the same rates as land in its immediate neighourhood. In Lower Burma, a nominal acreage rate of two annas is assessed on land which is left fallow for special reasons. But in Upper Burma in the dry zone all land not cultivated is exempted from assessment. In Lower Burma where a crop is destroyed by floods or other natural cause, the land is not assessed and in the dry zone of Upper Burma, if the crop is less than three-quarters of normal, it is considered a total failure and completely exempted from assessment.

After the original settlement, the settlement party handed over to the Land Records Department their maps with the boundaries of holdings

* An administrative unit corresponding to a local revenue division of a district in India (*tehsil.*)

marked and the holding register and these it is the duty of the Land Records Department to keep up to date. This holding register is only a record and has no presumption of validity. The Land Records staff merely enters against each holding the name of the person who appears primarily liable to revenue as in possession of the holding directly under the State and any dispute must be settled by the civil court. Where mutations are ordered by a court, they are communicated to the surveyor by the court. Mutations by registered holders must be brought to the surveyor's notice, and it is incumbent on all parties to alienation to report these to the revenue surveyor.

On his holding register and on his map, as corrected, the revenue surveyor draws up his annual assessment register. He has also in the course of his field inspection recorded statistics of the areas under different crops and of tenancies, mortgages and sales. When the rolls of the assessment season are complete, he prepares a tax ticket for each holding and these tax tickets are issued from the deputy commissioner's office.

The total expenditure on the Land Records Department for 1925-26 amounted to Rs. 25,46,158, including figures for Rangoon and the special survey party. The percentage cost to total assessment (excluding figures for Rangoon and the special survey party) was 5·99.

5. THE CULTIVATOR

The total population of Burma at the Census of 1921 was 13,212,192, of whom no less than 9,158,932 were engaged directly or indirectly in agriculture. Although Burma is the largest of the Indian provinces, it is by far the most sparsely populated and the bulk of the population lives in villages which number 35,048 as against only 79 towns. The balance between males and females is very level, there being 6,756,969 males and 6,455,223 females.

The density of population per square mile in Burma stands at 57 as against 226 for all provinces of India, but beyond the statement of this fact no useful inferences as to under-population or over-population can be drawn. In some districts where cultivation is widespread, the population is naturally denser than in those where there is a large amount of forest or unculturable waste and it is enough to state the figures without trying to draw any particular conclusions. There are three principal races of Burma, the Burmese, the Karens and the Shans while in the north and north-west part of the province we find the Chins and Kachins. Of these by far the most important are the Burmans, and the predominating religion of the country is Buddhism in which at the last census no less than 11,172,984 persons affirmed their belief. Buddhists are more than 5½ times as numerous as all the non-Buddhists put together and are nearly 19 times as numerous as the Animists who are the next largest class.

The ordinary village habitation is a hut raised on piles some little distance off the ground, built of jungle timber and bamboo matting and roofed with thatch or split bamboo. Better class houses have plank walling and floors and corrugated iron roofs are more and more being adopted. The house as a rule consists of a front verandah and an upper room which is reached by a flight of steps. The front verandah is used

as the living room of the house, the cooking generally being done outside on the ground or in a small kitchen at the side of the building: the upper room forms the sleeping accommodation of the family.

The Burmese dress is very attractive. The male dress consists of a jacket which is generally white, a cotton or silk coloured skirt (*paso* or *longyi*) and a silk head covering (*gaungbaung*). The women wear a jacket resembling the men's and a petticoat or skirt of silk or cotton. A gaily dressed Burmese holiday crowd is a very pretty sight as the brilliant colours of their silks get their full value from the bright sunshine.

The life of the average cultivator is made up of periods of arduous and exhausting labour in the fields followed by considerable spells of comparative idleness. But these slack periods are fully taken up by pagoda festivals or *pwès* (theatrical performances) and the observance of other social and religious customs which tradition has imposed upon him. During the seasons he is not employed in the fields, he resides in his permanent dwelling in the village. In the rainy season, when the cultivation of paddy or other crops absorbs all his energies and attention, he spends the greater part of his time in the fields, and, for convenience in working his land, he builds there a temporary bamboo hut where he can live with his family or hired labourers and with his working bullocks beside him.

In the drier tracts there is a greater variety in the choice of a dwelling place and it is more common to find the cultivator living throughout the year on his holding. Even in the paddy plains of Lower Burma permanent homesteads are becoming common in some districts, but the homestead as such is not a feature of the countryside. This herding together in villages is partly due to the natural inclination of the cultivator himself and partly to the operation of the Burma Village Act, which, for purposes of crime control, discourages the erection of permanent dwellings outside the boundaries of the village site.

The agricultural year may be said to commence with the break of the rains in May. In the paddy tract, field huts are built and firewood stored during the slack months of April and May and the nurseries are got down by the first fortnight in June. Ploughing and harrowing the remainder of the holding and the transplanting of the main crop are carried on into August, and in some of the later districts, may extend even into early September. But from then onwards till the latter half of November, when the early paddies begin to ripen, there is little field work to be done.

Harvesting becomes general during the first half of December and by the middle of January most of the crop in even the latest districts is off the ground. Threshing and winnowing the paddy occupy the greater part of February and by March the bulk of the crop has found its way into the hands of millers and brokers, or into the godowns of traders in the towns and villages who hold it for a rise in the market.

In the dry zone, the operations and seasonal work are of course different and probably cover a greater part of the year. But in all tracts, except in some of the irrigated areas, there is the same alternation of busy and slack periods with a more or less general cessation of agricultural activity in the hot weather.

The size of the average holding varies a great deal with the district but is generally a simple multiple of the area which can be ploughed by a pair of bullocks. Especially is this the case in the Lower Burma paddy plains where agriculture has become industrialised into the production of a single crop mainly for export, and where mixed farming is unknown. In these tracts the general allowance is one yoke of bullocks to every twelve acres although this proportion may vary from eight to fourteen acres in heavy and lighter lands. In Upper Burma, where farming is more mixed and carried out on a less extensive scale, the area worked by one pair is fifteen acres, but the yoke of bullocks in Upper Burma plays a smaller part in fixing the size of a cultivator's holding. In the dry tract, we find very small holdings associated usually with garden cultivation or worked as a part-time occupation by a cultivator who has another non-agricultural source of income ; but as a sole means of livelihood the diminutive holding, frequent in parts of India, is by no means common.

The Land Record Department has produced a table which shows the size of the average holding in Upper and Lower Burma :—

	Under 5 acres	Over 5 Under 10	Over 10 Under 20	Over 20 Under 50	Over 50
	Per cent	Per cent	Per cent	Per cent	Per cent
Lower Burma	55	15	15	11	4
Upper Burma	62	20	12	5	1

The figures in this table, however, have little agricultural significance, for they refer only to complete holdings owned by individual landowners in arbitrarily fixed areas of about 600 acres called *kwins* ; the actual area worked by a cultivator as a farm unit with the assistance of his family and hired labour is more. This unit is given in several settlement reports for particular districts, and the Agricultural Department has recently collected figures throughout the greater part of Burma which indicate more nearly what this unit is. In Lower Burma, it is comparatively large but declines in size northwards through the drier zones The following figures, although not based upon a sufficient amount of data to give reliable averages for whole districts, convey a better impression of the size of holding met with most frequently :—

Crops	Districts	Average size of holding in acres	Crops	Districts	Average size of holding in acres
Paddy ..	Hanthawaddy ..	67	Cotton ..	Myingyan ..	8·8
	Insein ..	40		Thayetmyo ..	4·4
	Pegu ..	35	Sesamum ..		
	Tarrawaddy ..	17	Sugarne, beans.	Yamethin ..	14
	Thaton ..	81	Paddy ..		
	Bassein ..	34	Paddy (Upper Burma).	Mandalay ..	7·9
	Myauungmya ..	26			
	Maubin ..	23			
	Akyab ..	17			

Quite large farms of 200 to 250 acres are found in Hanthawaddy, Pegu and Thaton districts worked by tenants on a yearly lease and, although these are not numerous, they demonstrate the system of agriculture which has been induced by the industrialisation of the paddy crop grown mainly for export.

The mention of tenants and hired labour indicates that peasant proprietorship is by no means universal in Burma. In an inquiry carried out into the condition of agricultural tenants and labourers by Mr. Couper in 1923, it was found that, in the places where figures were collected, an average of thirty-eight per cent of the land was worked on yearly tenancies and that in some townships it rose to as high as seventy-two per cent. This refers to Lower Burma where land is freely bought and sold by both agricultural and non-agricultural classes and where, by foreclosure, the small owner cultivator has frequently to part with his land in settlement of debts during a succession of bad seasons.

A small owner cultivator frequently rents additional land to work with his own, or he may hire out his own land and rent a larger holding to cultivate himself. The rents are almost always paid in kind and are fixed at so many baskets per acre usually representing from one-fourth to as much as one-half of the total produce. It is customary for the owners to pay the land revenue which varies from Rs. 1-8, to Rs. 4-8, Rs. 5 or Rs. 6 per acre according to the productiveness of the soil.

Tenancies are for a period of one year and the cultivator frequently changes his holding; Mr. Couper, for instance, found that out of ninety-nine cultivators only twelve had been in the same holding for more than four years. There is no great sentimental attachment for family reasons amongst owners and cultivators to particular land; and, as already indicated, paddy land is regarded among owners almost solely in the nature of an investment to be bought and sold as occasion demands. Affection for a paddy field does not exist, but where dry land is concerned, as in Upper Burma, sentiment plays a more prominent part and frequent changes of ownership are not so common.

Peasant proprietorship is the rule in Upper Burma, but in Lower Burma absentee landlordism with its attendant evils is a conspicuous feature of the paddy tracts. The larger landowners live in the towns and hire out their land yearly to the highest bidder. This unstability of tenure acts as a severe handicap to progressive agricultural improvement, for the cultivator can never be sure at the beginning of a season whether he will get his own land back again, or, indeed, whether he will get any land at all. If he loses his holding he may become a labourer for the year and hire both himself and his bullocks to some one else; but this represents a drop in status to be remedied, if possible, in the succeeding year by again becoming a tenant should land be available.

In spite of the large holdings and the comparatively extensive form of agriculture pursued there is as yet enough land to go round if fairly distributed. The density of the population varies, of course, from district to district, being greater in the rice lands of the delta and diminishing

in the dry zone and towards the hills. The delta, although comprising only fifteen per cent of the total area contains thirty-seven per cent of the population and the more densely populated districts are naturally found in this sector. There are four dense patches in the areas influenced by the large towns of Rangoon, Mandalay, Moulmein and Akyab, but even here the population is sparser than is common in India. The most dense population is in Maubin district with 201 persons per square mile, and the least dense Myitkyina with a figure of only 11 per square mile. Dry zone districts vary from 54 in Thayetmyo to 179 in Sagaing, the latter coming to a certain extent under the influence of Mandalay.

With a comparative plenitude of land and the lack of any custom insisting upon the sub-division of holdings among the members of his family on the decease of an owner, fragmentation of holdings in the Indian sense constitutes at present no problem whatever in Burma. When an occasion for the division of a property arises, the land is generally sold and the proceeds divided.

The Burma cultivator stands high among his Eastern fellows in respect of literacy. Owing to the existence of Buddhist monastic schools in almost every village the vast majority of the village boys are taught the rudiments of reading and writing. A heavy percentage lapses into illiteracy after such imperfect instruction, but those who remain literate into the adult stage constitute a proportion of the population which is more than three times as large as that in any other province of India. The 1921 Census gives the following comparative figures :—

Average number of literates, age 10 or more per 1,000

Males		Females	
Burma	India	Burma	India
576	161	123	23

The standard of literacy is not, of course, high, but the Burma figures include only those who are able to indite a simple letter to a friend; and most cultivators are capable of signing their names to a document even though they may not be able to read it completely or entirely understand its contents. Within recent years there has been a great expansion of vernacular newspapers. These find their way into most of the villages, especially those near the main roads and railways, and the happenings in the outer world, the prices of cotton and paddy in the main towns and all the miscellaneous items of news that go to make up a vernacular newspaper are available to most cultivators. The newspapers are very widely circulated and extensively read, the more enlightened villager reading them aloud for the information of his less advanced brethren.

With the means at his disposal the Burman cultivator cultivates paddy and other crops in an intelligent and fairly efficient manner. As a ploughman and paddy cultivator he is better than the average Indian immigrant; his fields are cleaner and better planted, and he shows more discrimination in the selection of varieties best suited to his land. As, however, it takes eight men to reap the crop which five men have sown, the Indian labourer is in considerable demand at harvest time and a good deal of the crop is reaped by such casual labour on contract rates. As has been previously noted the total number of immigrants to Burma by all routes during 1926 was 4,08,464, and although a very large number of these are permanently employed at the large ports and at the rice mills in the seaport towns, a considerable number seek only seasonal employment in the reaping of the paddy crop. In 1906, 3,42,597 emigrated back from Burma so that the balance of immigrants over emigrants was only 25,877. These become absorbed permanently in the industrial labour round the large cities, very few of them settling down in the country areas.

As he is able, as a rule, to obtain a comfortable living by his seasonal work, the Burman shows little inclination to exert himself to accumulate wealth, and thrift is not one of his marked characteristics. The Burman is notoriously generous and when funds are available money is spent freely either on religious objects or on giving entertainments for the amusement of his fellow villagers. When the money is gone resort is had to the moneylender or landlord for the means of financing the next year's crop. On account of his light-hearted attitude to the accumulation of wealth, chronic indebtedness is almost universal amongst the cultivating classes and the greater the credit the greater usually is the debt which is incurred. When the cultivator borrows from the *chettyar* (a member of a Madras banking caste) on a strict business basis of security the rates of interest vary according to the security tendered and are by no means as high as when he borrows from his landlord or village Burmese moneylender on the basis of repaying his debts in kind after harvest. The latter method of borrowing is most popular in the villages as the *chettyars* are somewhat strict in demanding security and are now unwilling to advance money on land. Loans of this nature—that is, repayment of debt in kind after harvest—are taken during the cultivating season, the basis being a sum of money for which a hundred baskets of paddy are paid back in February. The following table indicates the scale of repayment required:—

Loan taken in	Amount of loan	
May	Rs. 60 to 70	Repaid in February by 100 baskets of paddy worth Rs. 160 to Rs. 170.
July	,, 80 to 90	
August	,, 100	
September	,, 110	

6. THE AGRICULTURAL DEPARTMENT

The history of the Agricultural Department may be divided into three periods. The first is the period anterior to 1906 when agriculture was under the Director of Land Records and Agriculture. Under this administration, action on the agricultural side was spasmodic; there was no trained agricultural staff and a few government gardens under amateur enthusiasts represented the limit of effort. To these gardens, however, was due the introduction of the groundnut which has brought such great agricultural wealth to the province.

The second period dates from 1906 when a civilian Director of Agriculture was appointed. An agricultural chemist joined the staff that year and two deputy directors of agriculture were appointed in 1907. A period of acute financial stringency, in which the very existence of the department was threatened, followed by the outbreak of the Great War, brought operations practically to a standstill and it was not till 1918 that a forward step could be taken. But even in this period two large experimental farms were opened at Mandalay and Hmawbi and various smaller district farms of about twenty acres in extent for the trial under local conditions of new strains of seed produced on the central farms at Mandalay and Hmawbi. During this period the posts of economic botanist and of third deputy director of agriculture which had been sanctioned were not filled and the idea of an agricultural college was abandoned largely on account of financial stringency.

With the cessation of hostilities Government was in a position to devote more attention to the Agricultural Department and a comprehensive reorganisation scheme was sanctioned by the Secretary of State in 1919. This scheme was in general endorsed by a committee appointed by the local Government which reported in 1925, and as a result of the local Government's orders on that report the department is now constituted as follows.

The department is divided into two sections, the one dealing with field experiments, district demonstration and propaganda and the other with agricultural teaching and research. For the purposes of field experiments and district demonstration, the province is divided into eight circles, each under a deputy director of agriculture. This excludes the Shan States for which it is hoped that two deputy directors will ultimately be appointed when financial circumstances permit. At present an arrangement has been made by which work in the Shan States is superintended by deputy directors of agriculture stationed in Burma.

It is the intention that each of these circles should ultimately have a central farm. Uptodate five such central experimental farms have been opened at Hmawbi, Pyinmana, Mahlaing, Allanmyo and Akyab while the large farm at Mandalay, which is now the college farm, has uptodate served the purposes of the Northern circle. Two more farms are now being equipped at Mudon in the Tenassarim circle and Myaungmya in the Irrawaddy circle and, with the selection of a central farm for the Northern circle, the chain of central farms will be complete. There

are also subsidiary farms for special crops at Pwinbyu, Padu, Tatkon, Thayetmyo and Kyaukpyu.

The main duties of the deputy director are research on the agricultural problems of his circle. His first duty is to discover what these agricultural problems are and, having found them, to experiment on the central farms with a view to finding a solution. When a solution has been found he must endeavour to have it introduced into the general agricultural practice of his circle by demonstration and propaganda. He is assisted in the work of his circle by an assistant director, who is a member of the Burma Agricultural Service, two senior agricultural assistants for demonstration and propaganda work and the supervision of subsidiary farms and two senior agricultural assistants on the staff of each of his central farms. Great emphasis is laid on the importance of seed distribution and propaganda work. A considerable amount of this is done through the assistance of the Co-operative Department while in some tracts agricultural unions for the distribution of pure seed have been found very effective. The village or group of villages under a village headman is taken as the unit and in each union there is one or more privately owned seed farms which multiply pure strains for distribution to the individual members of the union. The necessity for the rapid multiplication of pure seed strains has been fully realised and it is the policy of the department to provide a connecting link between the central experimental farms and the agricultural unions or co-operative societies by the provision of seed farms in the areas where pure seed can be rapidly multiplied. In pursuance of this policy a number of areas, varying from 50 to 100 acres, have been taken up by purchase or by exclusion from grazing grounds so as to provide as large a number of such farms as possible. These will be let out to approved tenants of the Agricultural Department who will be responsible for the maintenance of the purity of the seed and, to a large extent, for its distribution. Some of these farms in the more important centres will be equipped with seed godowns and quarters for an agricultural assistant and field man so that the growing of the pure seed crop can be kept under the closest observation.

As has been pointed out above, the department was only organised in 1919 and the full recruitment of a superior staff sanctioned under that scheme was not completed till 1923. The result is that the work of the department is still largely in the experimental stage, and it is only in the Southern and Northern circles, which existed prior to 1919, that it has been possible to develop work on any organised scale. At the same time a few outstanding results have been achieved. For instance, in the Myingyan circle, which is one of the main cotton tracts of the province, a high yielding strain of cotton with a ginning percentage of 36 as against the ordinary 31 to 32 per cent is under distribution and seed has been given out for 5,000 acres. Both the *kapas* and lint of this strain can be disposed of at a premium of Rs. 5 per 100 *viss*,* but at present the crop is bought back by the department, ginned by them and the seed

* The viss = 3·6 lbs.

distributed by sale to cultivators. Further promising varieties have been obtained by selection and hybridisation. These have been submitted to the Cotton Technological Research Laboratory, Bombay, for spinning tests and as these have proved satisfactory the varieties will be thoroughly tried out under field conditions.

In the Lower Chindwin area the gram crop was practically wiped out by a wilt disease and the devastation was so general that Burmans called this area the "gram cemetery." By the introduction of an immune variety the Agricultural Department has totally replaced the local crops.

The work of the Central circle with headquarters at Pyinmana is largely concerned with sugarcane. A central farm of 54 acres was acquired in 1924 and the buildings and equipment have just been completed. The duties of its deputy director will be an intensive study of sugarcane in all its aspects and although too little time has elapsed for any particular results to be achieved, the existence of the farm has resulted in the introduction of sugarcane into several new areas in the neighbourhood. There is a ready demand for all available supplies of exotic canes for planting.

The central farm of the West Central circle is located at Allanmyo and extends to 143 acres. Its concern will largely be cotton and the improvement of the Lower Burma strain of that crop. In this circle two subsidiary farms have been opened, one for the study of tobacco and the other for irrigated rice in the Mon canal area. From this farm, which has been in existence for a number of years, improved strains of paddy have been introduced in the Mon canal area. The total seed distributed to date is 213 tons and there are now 52 private seed farms multiplying the strains for distribution.

The Southern circle dates back to the earliest days of the Agricultural Department and at that time was responsible for practically the whole of the experimental work for Lower Burma. Its field of operations has now been considerably restricted. The area of the farm is 450 acres—400 acres of rain-fed paddy land and 50 acres of garden land. The main object of the farm is to investigate problems connected with the cultivation of paddy under Lower Burma conditions, and, in particular, to improve the quality and yield of varieties suited for the export trade. Pure line selection from indigenous races has been the method adopted to improve the paddy varieties grown in the country and no less than 1,043 strains in all have been dealt with. As a result, seven improved strains of paddy are at present being distributed to suit most of the conditions met with in Lower Burma. The amount of pure improved seed issued from this farm last year and from its attached seed farms was 550 tons, sufficient for 24,652 acres. In addition to this work of selection, experiments on the manurial requirements of the soil and the utilisation of indigenous manures have been carried out, as also experiments in seed rates and methods of planting. The central farm has a ring of seed farms around it to demonstrate the results obtained on the farm to the cultivator in the district. Twenty seed farms, totalling 1,216 acres, have been opened and ten more farms, totalling 532 acres, will be opened

shortly. In addition, it is proposed to open two larger seed farms equipped with godowns at two of the main centres. These larger farms will have an area of 155 acres and 125 acres respectively and will act as the main centres of seed distribution of the two outlying halves of the circle. In the three other circles, the Irrawaddy circle, the Arakan circle and the Tenasserim circle, little progress has been made as these circles have only recently been constituted and the farms have not yet been fully equipped. In the first two the improvement of paddy will be the principal problem, and in the Tenasserim circle, although this will also be the principal crop, fruit and cocoanuts will occupy a good deal of the attention of the deputy director.

The scientific research work of the department is concentrated at the Agricultural College and Research Institute at Mandalay, the research officers being also professors in their subject at the Agricultural College. In the field of agricultural chemistry the agricultural chemist has for many years been engaged in an investigation into the prussic acid content of Burma beans (*phaseolus lunatus*). This enquiry was forced upon the department by the trade as one or two unfortunate accidents in feeding cattle, which had been attributed to Burma beans forming a part of their diet, had very seriously affected the market for this product. After many years' study the conclusion arrived at is that the prussic acid cannot be eliminated from the beans by selection and the efforts of the department are now being devoted to research for a substitute. The work has now been handed over to the economic botanist who has under trial 80 varieties of indigenous and exotic beans with a view to finding prussic acid free substitutes for the Burma beans of commerce.

From time to time a large amount of work has been done on soil surveys and systematic surveys of two districts are now in hand. The object is to discover, if possible, a co-relation of soil types with paddies particularly suited to such types, a work which when successfully completed will be of permanent value. Apart from these systematic surveys detailed surveys have been made of all the government farms and a large number of surveys for private applicants. Another line of work is a series of analyses with a view to investigating the possibilities of the manufacture of citric acid and the extraction of essential oils. An investigation of some interest and of a rather peculiar nature was undertaken by the agricultural chemist at the instigation of the Department of Public Health. Frequent complaints were received that the process of parboiling of paddy amounted almost to a nuisance to the neighbourhood in which the operation was carried out on account of the supposed noxious gases which were given off in the process. The problem has been completely solved and the improved process has been adopted by European millers and others in Burma. It is understood that it has also been taken up in the Federated Malay States, in Siam and in Ceylon. In addition to these particular lines of investigation a great amount of work has been done in the analyses of soils, manures, fertilisers, oil-seeds, etc., for the Agricultural Department and for other departments of Government and the public. It may be noted that great difficulty has been experienced in recruiting suitable trained assistants for the

subordinate staff. But this state of affairs will doubtless be remedied when the Agricultural College begins to function.

Until the arrival of an economic botanist a large amount of botanical work was done by the deputy directors in Upper and Lower Burma. Now that an economic botanist has been appointed to the staff he has been given a separate area and establishment on the college farm at Mandalay on which all the plant breeding and selection work in connection with rice and various dry zone crops is carried out. The area devoted to plant breeding and selection is 20 acres and in connection with the college a teaching garden containing representative species of the various natural orders is being laid out while a fruit garden will also be opened for purposes of instruction. In addition to this, the economic botanist has free access for work to certain of the central farms. Work at present is being mainly devoted to paddy, wheat, gram, beans and sesamum, but here again, as in the chemical section, much difficulty is experienced in getting a trained staff of assistants.

A mycologist was appointed to the staff in 1923 but the college laboratories for his accommodation were not completed until 1924. A beginning has been made with the study of various fungus diseases of sugarcane, sesamum, *jowar*, wheat, gram, cotton, betel vine and groundnuts, while a considerable amount of advice has been given to rubber companies and to sugarcane, tea and coffee estates.

An entomologist (who is a member of the Burma Agricultural Service) deals, so far as he can, with the vast number of insect pests to which the crops of Burma are subjected. Considerable success has attended efforts to deal with palm beetle and with land crabs both of which are serious pests of the province. Attention has also been devoted to lac culture, the object being to work out a practical method of growing lac on cultivated plants for cultivators in the plains while some experiments have also been carried out in bee-keeping. The most important part, however, of the work of the entomologist has been in connection with sericulture. Here the lines of work have been first to find out a multivoltine race of worms suitable to local conditions. Considerable success has been achieved in this direction, two strains having been obtained which are wholly multivoltine and give a much higher yield of silk. The other main objects are to work out the best method of growing mulberry under the varying conditions in the hills and plains of the province and to study the economics of the industry from the point of view of the rearer. Efforts are being made to foster the industry by the supply of mulberry cuttings and seedlings and of eggs or seed cocoons of improved races which have been examined and guaranteed free from disease, while the question of reeling has also been taken up and efforts made to introduce the industry into new districts.

The agricultural engineer is fully occupied with the routine work of the department and with the manufacture of improved implements, water-lifts and other agricultural appliances. A new type of plough has been designed and put on the market. At present these are manufactured in England, but a local blacksmith at Pyinmana is also turning out these ploughs in quantity for local sale and to supply orders

from the Agricultural Department. There seems no reason why the manufacture should not ultimately become local. The manufacture of improved water-lifts, introduced by the agricultural engineer, has been taken up by certain village carpenters and they are being sold freely. A new type of jaggery-boiling furnace has also been designed which is capable of burning the dried stems or megass. This effects a very marked economy in fuel. In addition to his actual work on agricultural machinery the agricultural engineer has also the supervision, in some cases, of the construction of the smaller departmental buildings on the farms.

It is to be regretted that practically no progress has been made in the matter of stock breeding or dairying, but it is now proposed that the Tatkon farm should be devoted to cattle breeding, the object being to build up a herd of pure Burmese cattle and also to conduct certain experiments in cross-breeding.

An interesting feature has been the establishment of agricultural improvement committees which have been formed in five districts. These are largely non-official though for the time being the deputy commissioner of the district or the deputy director of agriculture acts as chairman. The functions of these committees are mainly advisory and may be defined as follows:—

(1) The committees act in an advisory capacity to Government in general and to the Agricultural Department in particular in matters relating to the agricultural improvement and development in a district.

(2) The committees arrange for the holding of shows and exhibitions in the district.

(3) The committees make recommendations with regard to the grant of loans or grants-in-aid under the Land Improvement Loans Act and carry out such other duties as may be referred to them from time to time by the local Government.

The main results achieved by the department up to date may be briefly summarised as follows. It is estimated that 200,000 acres of rice in the province are under selected varieties distributed from the Hmawbi and Mandalay farms. The superior value of this rice is now recognised by the market both in London and on the Continent. It is free from the objectionable red grain, is of a uniform shape and consistency and when milled gives an increased outturn which averages about 3 baskets of white rice per hundred baskets of paddy milled. Premia are paid by millers of all classes for paddy grown from the Agricultural Department's seed, these premia varying from Rs. 5 to Rs. 15 per hundred baskets * of paddy.

In certain parts of Upper Burma, the gram crop was almost entirely eliminated by the fungus *fusarium udum*. The soils had become so impregnated with this disease that it was impossible to grow the crop more than one year on the same ground. The Agricultural Department tackled the problem and after experiment with varieties received from every province in India a variety from Karachi which was found to be

* Baskets vary but average weight is 46 lb.

fairly immune was placed under selection with the result that a completely immune strain was evolved and seed multiplied. In 1923 enough seed of this immune variety was distributed to sow 28,000 acres. The distribution has continued with the result that the old variety has been completely ousted. The Director estimates that the annual money value of this piece of work is nearly as much as the present expenditure on the whole department.

In cotton work has hardly advanced beyond the experimental stage but the selected varieties with a higher ginning percentage have been distributed and 5,000 acres sown with this seed. Cambodia cotton has also been introduced and distributed in suitable areas, the total area now being about 6,000 acres. Similarly new types of groundnut, showing an increase of 15 per cent in the oil content and much easier to harvest than the local varieties, have been successfully introduced. Considerable improvements have also been effected in agricultural machinery.

With regard to agricultural education, as has been noted above, the idea of an agricultural college was for financial reasons kept in abeyance until it was revived in the reorganisation scheme of 1918. During this period and until the completion of the college, the province had to rely upon the friendly offices of the Government of Bombay for the training of its subordinate staff and by an arrangement with that Government large numbers of students were trained at the Poona Agricultural College. The Agricultural College at Mandalay was formally opened by His Excellency the Governor, Sir Harcourt Butler, in December 1924. It is well equipped with laboratories which provide ample accommodation for teaching and research in agricultural chemistry, botany, mycology and entomology, while instruction is also given in English, mathematics and physics. There is also an excellent library. The early experiences of the college have not been too happy. Apart from research its primary object was laid down as the instruction of a staff for the Agricultural Department. It was at first proposed to hold a four-years' course leading to a diploma and when the course commenced in 1924 stipends were given to 24 students, for the most part possessing the high school qualifications, with a promise of employment in the upper subordinate establishment in the event of their obtaining a diploma. It was also intended to introduce a shorter two-years' course for candidates for the lower subordinate establishment. The high school final qualification, however, was not found to be satisfactory, the standard being too low and an attempt was then made to substitute a three-years' course with I.A. or I.Sc., as a standard of entrance. The intention was to affiliate the college to the Rangoon University but the scheme had to be abandoned almost immediately owing to the paucity of candidates that applied. A three-years' diploma course is now being started. At the present moment there are 11 third year students, 15 second year students and 20 first year students taking this course.

Apart from the courses of instruction at the college, special short courses are held at central farms to provide practical instruction for cultivators and their sons. These courses are designed to give practical

instruction in the use of improved implements and to demonstrate improved methods. Stipends are also offered to the sons of cultivators and landowners to enable them to undergo training for longer periods on the central farms.

Outside of Government effort, the only other attempt at agricultural education in the province is the Pyinmana Agricultural School—a vernacular school conducted by the American Baptist Mission. Government gives grants for building construction up to half the total cost or Rs. 75,000, whichever is less, and a yearly grant for recurring expenditure increasing from Rs. 2,200 to Rs. 18,000. The aim of the school is to give an agricultural education to village boys who have completed the fourth standard of the vernacular primary school. Instruction is entirely in Burmese although English and literary subjects of the middle school course are also taught. The total area of the school farm is nearly 180 acres and the buildings are nearing completion. There are at present 62 students in the school, but there will be accommodation for 120 when the buildings are completed.

The following statement shows the receipts and expenditure under "Agriculture" for the ten years 1915-16 to 1924-25 :—

Year	Receipts	Expenditure
	Rs.	Rs.
1915-16	16,026	2,67,153
1916-17	24,733	2,49,783
1917-18	17,328	2,66,882
1918-19	20,562	3,84,717
1919-20	31,178	3,10,585
1920-21	20,810	3,84,066
1921-22	34,489	5,05,373
1922-23	40,563	6,50,249
1923-24	54,930	7,83,847
1924-25	61,967	8,17,394
Total ..	3,22,586	46,20,049

7. THE VETERINARY DEPARTMENT

The Government of Burma devoted some attention to veterinary matters long before the question of an agricultural department was considered. Thus as long ago as 1876 we find that there was a veterinary instructor in the province and from 1884 onwards a certain number of veterinary assistants. The staff of veterinary assistants rapidly increased until, in 1906, there were 120 with 10 inspectors, 5 deputy superintendents and 3 superintendents. At the end of 1925 there were actually employed 3 superintendents, 8 deputy superintendents, 24 veterinary inspectors and 214 veterinary assistants.

The special committee which recently investigated the Agricultural Department reported also on the Veterinary Department and on their

recommendations the Government has passed the following orders. The province will be divided into four circles and nine sub-circles, the former being under superintendents and the latter under deputy superintendents. The cadre of the Burma Veterinary Service (Provincial) will be increased from nine to fifteen, nine to be employed in charge of the sub-circles in the district and six at the Veterinary College at Insein. Veterinary inspectors will be increased to twenty-eight and veterinary assistants to two hundred and eighty on pay ranging from Rs. 50 per month to Rs. 150. Simultaneously the standard of education required for admission to the Insein Veterinary College will be raised to the high school final. At present veterinary assistants are appointed after passing a three-years' course at the Veterinary School at Insein. Inspectors are recruited partly by promotion from the rank of veterinary assistants up to two-thirds of the cadre of inspectors and the remainder from amongst students who have taken a diploma at the Calcutta Veterinary College. These students were sent to the Calcutta College with stipends by the local Government. Deputy superintendents are selected from among Calcutta-trained graduates and in rare instances by the promotion of vernacular veterinary inspectors. The province is divided into circles controlled by superintendents of the Indian Veterinary Service and these circles are divided into sub-circles controlled by deputy superintendents. The scheme aims at two veterinary inspectors for each sub-circle and one veterinary assistant for each township. A certain number of assistants are kept in reserve for emergencies or to control frontier stations. District councils are in theory responsible for the health of cattle in their districts but veterinary assistants are paid from provincial funds which also pay for their travelling allowance. They are lent to the district council for the districts to which they are posted. District councils pay their contingent expenses and copies of all diaries go to the chairman of the district council. The head of the Veterinary Department has the power to transfer veterinary assistants from one district to another. In Burma the duties of the staff are largely determined by the Cattle Diseases Rules, 1914, which apply practically to all areas in which the Burma Village Act of 1907 is in force. Under the Burma Village Act the registration of the death of cattle is compulsory and must be done by the owner within 48 hours of the death. The Cattle Diseases Rules of 1914 lay down clearly the responsibilities of villagers in cases of outbreaks of cattle disease and as to treatment of the carcasses and skins of cattle that die. The system followed in Burma is that of the peripatetic veterinary assistant. There are only four veterinary dispensaries in the province and the public seem to evince little enthusiasm for them. The vast areas of the agricultural districts and the difficulties of moving cattle militate against any wide development of the principle of the stationary dispensary and it is thought that more good is done by the veterinary assistants moving freely from village to village with supplies of medicine and attending to cases in the course of their tours.

In 1923 Government appointed a committee to investigate the question of the Insein Veterinary School and its future. As a result, the school is now being completely reorganised as a teaching and research college.

When this reorganisation is completed, Burma will be independent of other provinces for training its superior staff. A building scheme involving an expenditure of slightly over three lakhs has been put in hand and the buildings are nearing completion. It is intended that the college should be fully equipped with laboratories both for teaching and research. The entrance standard proposed is the high school final followed by a three-years' course at the college and accommodation has been provided for eighty students. If the standard is kept sufficiently high it will be possible to train students at Insein for admission to the Burma Veterinary Service.

8. IRRIGATION

Burma is so bountifully blessed by Nature in the matter of rainfall that it is only in the dry central zone that irrigation is of any importance. It may be said that where irrigation is available it is entirely directed to rice cultivation. In fact this crop represents ninety per cent of the whole area under irrigation. On the four major canals of the province no less than ninety-nine per cent of the land irrigated is under rice. It is only in the Kyaukse district that irrigation is devoted to any extent to crops other than rice and this district accounts for about half of the total irrigated area under crops other than the rice crop. Here also a certain amount of double cropping is done, sesamum being sown over a large area before a late rice crop is taken off.

Irrigation was practised by the Burmans long before the British occupation of the country and in fact has been known in the dry zone of Upper Burma from time immemorial. The physical formation of the province militates against irrigation schemes of any magnitude but smaller schemes can be multiplied and the area irrigated in Upper Burma has been trebled since 1901. In many cases, the work has consisted of the realignment and remodelling of schemes originally started by Burman agency.

Irrigation works in Burma were reclassified in 1926 and for purposes of comparison this reclassification may be applied as having existed from 1891 the year from which reliable records are available. The classification is into two groups (1) productive works for which capital accounts are kept, (2) unproductive works for some of which capital accounts are kept and others for which capital accounts are not kept. The first group includes the Shwebo and Mon canals, constructed between 1901 and 1911, and the more important of the indigenous works—the Kyaukse Canal, the Shwetachaung Canal, the Man Canal and the Meiktila Lake. The second group embraces the Mandalay and Yeu Canals, the Salin Canal, the Nyaungyan-Minhla Tank and the Kyaukse Tank, for which capital accounts are kept, and all the numerous petty canals for which no accounts are kept.

The average annual irrigation area for 5-year periods has increased from 238,331 acres in the quinquennium 1891-95 to 737,883 acres in the quinquennium 1921-25.

The irrigation done by the four major canals has increased from 358,997

acres in 1921 to 406,472 acres in 1925. The area irrigated by productive capital works (group 1) has increased between 1900 and 1925 by 325,168 acres or 206 per cent; that by capital unproductive and non-capital (group 2) by 196,389 acres or 214 per cent. In 1901, the mileage of Government channels open for irrigation was 593; in 1925 it was 1,717 miles representing an average increase of 45 miles per annum over 25 years.

The total capital outlay—direct and indirect—on productive works in operation till the end of 1925-26 has been Rs. 1,86,25,709. The percentage of profit on capital outlay (including interest on capital outlay) has been 4·34 per cent and the total income including water rate and miscellaneous receipts and share of land revenue due to irrigation works has been 7·72 per cent on the capital outlay. The corresponding figures for unproductive works for which capital and revenue accounts are kept have been Rs. 1,47,96,785 capital: 1·05 per cent profit on capital outlay and 2·48 per cent profit when the total income—direct and indirect—is included.

The four major canals were originally constructed from funds supplied by the Government of India. In 1921-22 the Government of Burma purchased them for Rs. 2,20,98,665 and the revenue from irrigation is now entirely provincial. No water rate is charged. A consolidated rate is levied on all irrigated areas, the Irrigation Department receiving in some cases a credit of a percentage of the consolidated rate and in others the whole rate less a fixed rate credited to land revenue. The object aimed at is to simplify collection of the revenue and it has worked well. In the Shwebo Canal area, the canal revenue staff, whose duties consist of seeing to the distribution of water and checking areas irrigated, has been amalgamated with the land revenue staff and it is proposed to extend this system to other districts. The policy is to amalgamate the irrigation revenue staff and the land records staff so far as this is possible and so effect economies in revenue collection. Up till now the revenue has always been assessed and collected by the revenue officers.

In a country like Burma where there are so many natural waterways and where the control of these natural waterways and protection against flood are of almost equal importance with that of the provision of water through irrigation channels, it is but natural that a great deal of the work of the Irrigation Department is devoted to questions of navigation and embankments for the prevention of floods.

On the side of navigation there are two important canals in Lower Burma maintained by the department which are of great importance in the commercial development of the province and on which tolls are levied by Government. The first is the Pegu-Sittang Canal completed in 1877-78 and the other the Twante Canal completed in 1916-17. The former canal connects the Sittang with the Pegu river and enables timber from the Sittang Valley to be floated to Rangoon *via* the Pegu river. It also carries a considerable traffic of rice, vegetables, bamboos and firewood. The Twante Canal carries a very heavy traffic in rice from the delta districts to the Rangoon mills and also provides a short cut for river steamers coming from the delta to Rangoon. The Pegu-Sittang Canal

has never paid for its upkeep directly, though it is a very useful waterway and probably makes indirect contribution to the revenues of the Province by the commercial advantages which it gives. In 1924-25 the gross revenue was Rs. 2,22,972, the working expenses being Rs. 4,46,680. The Twante Canal, on the other hand, brought in Rs. 4,61,110 in the same year, the working expenses being Rs. 1,17,273 and the net revenue Rs. 3,43,837 representing a profit percentage of 6·69 on the capital outlay. This canal was constructed from funds supplied by the Government of India, but it was purchased by the local Government in 1921-22 for Rs. 45,64,692.

In Upper Burma, the only navigation canal of any importance is the Shwetachaung Canal in the Mandalay district which combines the functions of an irrigation and a navigation canal. This has never been a considerable source of income to Government and as a metre gauge line is being constructed parallel to the canal and it is proposed to construct a metal road along the canal bank, it is likely to cease to be used as a navigation canal for the carriage of goods by water.

Within recent years nearly twenty-five lakhs of rupees have been spent in cutting new waterways and improving existing ones in the Irrawaddy delta to facilitate communications between stations in the delta and Rangoon and expenditure approximating to 16 lakhs is in contemplation. All these improvements, while they give no direct return, facilitate the movement of agricultural produce to market and materially improve the trading conditions of the country.

The third branch of the activities of the Department of Irrigation is concerned with embankments, the majority of which are regarded as productive as the department receives a credit of fifty per cent of the gross land revenue demand on the areas protected by them. These embankments have been in existence for many years, the Maubin Island and the main Irrawaddy embankments dating back to the early 'eighties. The capital cost of the seven embankments which are regarded as productive was Rs. 48,86,617, protecting in 1924 an area of 848,891 acres and yielding a net revenue of Rs. 5,84,116. These figures show a return of nearly twelve per cent on the capital cost of the works taken collectively. In addition there are numerous small protective works up and down the delta which are regarded as unproductive and in many cases small embankments have been made and are maintained by the cultivators themselves.

Finally, it only remains to remark that great attention is now being devoted to projects for improving the drainage of areas liable to floods. An interesting system of river training without embankments has been evolved by Messrs. F. A. Leete, C.I.E., and G. C. Cheyne, M.B.E., and gives every prospect of permanent success.* The result of this comparatively inexpensive method of river training is to reclaim annually large areas of land suitable for cultivation by a regulated deposit of silt

* "Regulation of Rivers without Embankments." Published by Messrs. Crosby Lockwood and Son, Stationers' Hall Court, Ludgate Hill, London. 1924. Price 30 shillings.

from the streams. Extensive surveys are being made all over Lower Burma with a view to estimating what further steps can be taken to improve the drainage of these flooded tracts.

Reference may also be made to the hydro-electric survey of the province. A rough general survey has been carried out, but a more detailed investigation of certain areas is being undertaken, especially with reference to the provision of a hydro-electrically directed water supply for the city of Rangoon. In this enquiry attention will also be devoted to the possible industrial utilisation of the power generated.

9. FORESTRY IN RELATION TO AGRICULTURE.

The latest report of the forest administration in Burma gives the total area of forest land as 148,396 square miles or two-thirds of the whole province, of which 95,374 square miles are unclassed forests and 31,460 square miles are reserved.

In unclassed forests the control of the Forest Department is generally limited to the protection of certain species, principally teak. For the reserved forests, the Forest Department is directly responsible for the entire management. Little attention can be devoted to the unclassed forests and in consequence promiscuous grazing and unregulated extraction of forest produce are rapidly depleting them of useful growth with the result that they are steadily deteriorating. In the more remote and less accessible forests, the objectionable custom of *taungya* or shifting cultivation, carried out by wandering tribes of cultivators, is having a most deleterious effect on the forests.

In the case of reserved forests, the interests of the cultivators are safeguarded by the forest settlements at which the settlement officer lays down the amount of bamboos, thatch or other forest produce which can be removed under the settlement by the villagers in the vicinity. In 1925-26 the value of produce, including grazing, removed from the reserved forests under the rights and privileges conferred by the settlements was Rs. 2,65,000 and timber for use for house building and other produce granted free under the similar arrangements was valued at Rs. 1,98,000. This however by no means represents the total benefits derived by the cultivators from the forests as naturally they take the bulk of their supplies from the unclassed forests which are not under control and no records of such extractions are kept.

It may be noted that apart from direct benefits derived by cultivators from the free utilisation of forest produce, the principal benefit which forests confer on agriculture in Burma is the amount of work provided for the agricultural population in these forests. It may be said that labour required for the trade extraction of timber is almost entirely supplied by the agricultural population. About a million tons per annum are extracted at an average cost of at least Rs. 25 per ton and a very large amount of this total sum of 2½ crores of rupees passes into the hands either of agriculturists who work in the forests in their spare time or of members of agricultural families who can be spared for more continuous

work in the forests. In addition, the constant demand for bamboos for building and for fuel and other minor forest products gives constant part-time employment to the agriculturists while the labour required for the various works necessary for the improvement and maintenance of the forests is supplied almost entirely by agriculturists in their spare time. In fact, in a country where all the houses outside of the larger towns are built of wood and bamboos and roofed with thatch the relations between the agriculturists and the forests are of the closest and not unnaturally the bulk of the work in connection with the extraction of these products is conducted by the agriculturists themselves. The Chief Conservator of Forests estimates the average annual requirements of the rural household in forest produce at timber 50 cubic feet, firewood 250 cubic feet, bamboos 300 cubic feet, thatch 400 bundles and in practically every case the requirements of the small agriculturist are extracted and handled by himself. The records for grazing show that during the year 1925-26 only 5,402 buffaloes and 26,474 cows and bullocks availed themselves of grazing on payment. On the other hand, over 150,000 buffaloes and over 340,000 cows and bullocks enjoyed grazing in forests by rights conferred upon the cultivators under the settlement, while a certain amount of free grazing was also granted during the pleasure of Government or otherwise than under the settlement.

At present it cannot be said that the conflict between agriculture and forests is acute though in the more densely populated parts of Lower Burma there is constant conflict between cultivation and forest rights when applications for the throwing open of a fuel reserve to cultivation come up. Any proposal to throw open a fuel reserve to cultivation is almost invariably opposed by a public opinion equal in strength to that which demands transfer to cultivation and the maintenance of the balance between the conflicting interests of agriculture and forestry will become increasingly difficult as the population increases and as the forests near villages become depleted of the produce which the agriculturist requires for his local needs. The present position may be summed up in the statement that at present the supply of forest produce is generally adequate but the accessible areas of supply outside reserved forests are being rapidly depleted before the demands of cultivation, grazing and wasteful exploitation. The people now have to go further afield for their supplies and in many cases this has involved such a burden that a recognised trader in forest produce replaces the old system by which the individual extracted his own requirements. In these circumstances, the policy of the future contemplates the gradual absorption of the vast areas of unclassed forests so far as this can be effected either by reservation or by allotment as village waste for the use of definite village communities. The definite allotment of land as village waste has the advantage that the villagers concerned will have the right to protect such land, a right which at present they do not enjoy. In order to meet the increased demand on the reserved forests which has arisen within recent years, considerable attention is being devoted to regeneration and planting up operations. On the general relation between

forests and agriculture in Burma, the Chief Conservator writes as follows :—

"Where the interests of forestry conflict with those of agriculture the problem of correlating them is not always easy. It is accepted as axiomatic that land suitable for permanent cultivation should be released for the purpose unless there are exceptionally strong reasons for retaining it under forest. On this policy the bulk of the reserved forests have been relegated to the hills and those in the plains have been restricted in area to what is essential to supply the wants of the surrounding population. Pressure of population upon the soil is responsible for periodical demands to eliminate the limited blocks of forest that have been retained in the plains. It is, however, generally recognised that a cheap and accessible supply of forest produce is a necessity to the peasant proprietor and this supply cannot be made available unless there is a proper provision for the maintenance of land under forest. A recent careful enquiry into the status of the reserves in the plains on either side of the Pegu Yomas has shown that when the matter is properly examined, both the district authorities and the people themselves are fully alive to the value of these reserves in the rural economy. In the case of the reserved forests on the hills the demand to push back their boundaries has not arisen and is unlikely to arise in the near future in view of the low agricultural value of the land and in the face of our present policy of working the accessible portions primarily for the benefit of the local people. There will, however, arise at intervals a clamour against the restrictions imposed by forest regulations. In resisting this much will depend on the extent to which people can be educated to realise the necessity for conserving supplies and to understand that restrictions in the methods of extracting and utilising forest products are necessary for conservative management. The ideal position would be to have portions of the communal lands set aside for the production of forest crops and managed by co-operation under State supervision. Under existing conditions, bamboos are frequently planted as a garden crop, and occasionally an enterprising individual has planted cutch trees for use as house-posts and fuel. There has, however, been little system and no co-operation in the matter, and until these materialise any reduction in the accessible areas of our reserved forests would be a very short-sighted policy, both from the point of view of the State and that of the agriculturist."

10. GENERAL EDUCATION.

The latest report of the Director of Public Instruction shows that the percentage of scholars to the total population in 1926 was 6·8 males and 2·41 females or a percentage total for the province of 4·66. The province has one university consisting of two constituent colleges, the University College, Rangoon, and the Judson College, Rangoon, and an Intermediate Arts College at Mandalay. For males, there are 149 high schools with 38,589 pupils, 1,326 middle schools with 125,384

pupils, 3,584 primary schools with 172,224 pupils and 725 special schools with 14,020 pupils. For females there are 259 high schools with 6,539 pupils, 174 middle schools with 17,656 students, 677 primary schools with 35,023 pupils and 31 special schools with 666 pupils. In addition to this there are 18,489 unrecognised institutions with 203,710 pupils. It may be remarked that the monastic system of education takes a very large place in the education of the rural population. 1,184 of these schools with 69,684 pupils are on the aided list and in addition there is a very large number of private monastic schools roughly calculated at 17,398 with 179,210 pupils. From the point of view of the Education Department these schools are of no great value in the strict educational sense but it cannot be denied that they contribute very largely to the literacy of the province. Thus the census figures for 1921 show an average proportion of literacy over the age of ten as 576 for males in Burma in every thousand as compared with 161 in India, and 123 females in Burma as against 23 in India. It is to be feared however that, as in India, the bulk of the pupils go very little further than standard II. In these circumstances the possibility of introducing agricultural teaching into the ordinary schools of Burma seems very remote despite the higher general standard of literacy in the province. There has, in fact, been no attempt at teaching agriculture in ordinary schools beyond an experiment with school gardening which failed in its object because it was regarded as a vocational subject and not merely as an effort to introduce some pleasant variety into the school curriculum. As a college of agriculture has only recently been opened in the province, no serious attempt has yet been made to tackle the question of agricultural education in other institutions.

The total expenditure on education in 1925-26 was Rs. 1,72,41,598, nearly 27 lakhs of rupees more than in 1924-25. Of this Rs. 78,06,450 was met from provincial funds, Rs. 17,46,800 from local funds and Rs. 7,34,906 from municipal funds. The balance is met from fees, funds of the Federated Shan States, and payments by missions or managers on account of their share in the maintenance of schools which receive grants-in-aid. It may be remarked that over fifty per cent of the expenditure shown under local funds was contributed by provincial revenues. As in other provinces of India, education is a matter in which the local legislature takes the keenest interest and progress both in expenditure and in the raising of the standard will be rapid.

11. CO-OPERATION.

The co-operative movement is one of great importance and the statistics of the movement may be of interest. At the end of June 1926, there were 5,383 societies of all kinds with a total membership of 147,264. The total amount of working capital, excluding sale and insurance societies, was Rs. 4,74,83,833 and the total expenditure on management Rs. 16,48,435. During the last few years, there has been a considerable weeding out of unsatisfactory societies and the number of societies and of members shows some reduction over the last four years.

The apex institution of the movement is the Burma Provincial Co-operative Bank Limited, with headquarters at Mandalay and branches at Rangoon, Thaton and Bassein. The capital of the bank is made up of shares of Rs. 100 each held by individual shareholders and shares of Rs. 100 held by constituent societies and the capital of the bank at the close of the financial year 1926 was Rs. 6,61,540. Fixed deposits are received from the public at rates of interest which are varied according to the requirements of the bank, but run about 5½, 6, 7 and 7½ per cent for one, two, three or four year deposits. The bank at the close of the financial year 1926 held fixed deposits of Rs. 85,62,002. An important source of finance also are the deposits in its saving bank section which undoubtedly have induced a spirit of thrift among the people. In addition, certain co-operative societies also deposit their reserve or surplus funds in the provincial bank and over 7¼ lakhs were made available from these sources during the year. The bank has investments in Government paper of over 33¾ lakhs. The provincial bank as the apex bank of the system provides fluid reserves for all district banks, town banks and urban societies which seek its assistance and its branch banks at Rangoon, Thaton and Bassein undertake the duty of financing credit societies in their local area and also of attracting local capital.

In addition to the provincial bank, there are 23 central banks which perform for small areas the functions of the provincial bank from which, if local supplies of capital are not ample, they can obtain funds. Omitting money lent by societies of one class to societies of another class, the net amount of working capital in these central banks was at the end of June 1926 Rs. 49,80,225 and they showed a profit on working of Rs. 1,29,191.

As in other provinces, the most important and most numerous class of society are the primary agricultural societies of which there were at the end of June 1926, 3,919 pure credit societies, 111 tenancy co-partnership and credit and 2 land mortgage societies. These credit societies are of course the base of the whole movement and engage most of the time of the administrative staff. Primary credit societies have a total membership of 87,781 and a share capital of Rs. 37,57,386. The profit for the year amounted to Rs. 3,59,420. The average loan at the end of the year under report was Rs. 197. Above these primary societies are unions for supervision and guarantee numbering 569. These exercise supervision, inspection and primary audit.

In comparison with credit societies, progress in other directions has not been great. For instance there are only 21 purchase and sales societies (agricultural) and 6 non-agricultural. There are 6 agricultural production societies and 3 non-agricultural production societies. There are 395 cattle insurance societies, confined entirely to five districts in Upper Burma, but it cannot be said that they are very active. It is in district agricultural and co-operative associations and union group boards that the link between co-operation and agriculture is strongest and it is the policy of the Agricultural Department to run private seed farms by the agency of co-operative societies and their members. Some success has

been achieved in Upper Burma where a considerable amount of seed and implements have been distributed through co-operative societies, and private seed farms have been established which are run by co-operative societies and their members. In Lower Burma progress is slower but the principle is gaining in popularity and the Agricultural Department look to the Co-operative Department for great assistance in the matter of runing seed farms and in the distribution of the approved products of the Agricultural Department. The link between the officers of the two departments is close and, as the Agricultural Department supplies the material, the Co-operative Department will be in a position to assist in its wider distribution. From the statistics given, it cannot be said that co-operation has made any very marked impression in Burma as a whole. It is doubtful if more than five per cent of the total population who might become co-operators have as yet joined the movement.

12. COMMUNICATIONS AND MARKETING.

The physical features of the province have been the principal factors in shaping the systems of internal communication as these have been progressively developed. The general conformation of the country is that of river valleys separated from each other by great mountain ranges and these naturally present considerable obstacles to the construction of a general network of roads or of railways such as is possible in the great plains of India. The rivers have been the dominating factor and the tendency therefore has been for trade to establish itself most firmly in those areas possessing natural means of communication by water. In fact, it has been pointed out that only ten of the thirty-eight district headquarters cannot be reached at all times of the year by ocean steamers or river launch. When the British occupied Burma there were practically no roads in the accepted sense of the term, but only jungle tracks and such roads as were constructed in the early days of the British occupation were designed mainly to link up posts on the frontier with district headquarters. The first road of any importance was constructed in 1861 from Myede in the Thayetmyo district through Prome to Paungde, and ten years later it was continued to Rangoon. When in 1874-77 a metre gauge railway was constructed along this road to connect Prome with Rangoon, a new road was necessitated parallel to the railway. Simultaneously a road between Pegu and Rangoon was constructed and its continuation to Toungoo was contemplated. But with the construction of the railway to Toungoo in 1885 the scheme was abandoned and attention was devoted to the construction of feeder roads. A road was also started from Moulmein, the ultimate terminus of which was contemplated as Ye, but this road has never been completed. Moulmein is now connected with Ye by a railway.

The annexation of Upper Burma diverted expenditure from communications in Lower Burma to the provision of roads for military requirements in the upper province, and frontier troubles led to the construction of numerous roads on the frontier. Fortunately, however, railway construction has kept pace with the general development of

the province, and the line from Rangoon to Mandalay was opened in 1889. An extension from Sagaing on the west bank of the Irrawaddy to Myitkyina was begun in 1890 and opened in 1899. The requirements of the delta were met by the construction between 1873 and 1900 of three canals to connect the creeks at the mouths of the Irrawaddy, Rangoon, Pegu and Sittang rivers to provide inland waterways for country boats. Of these the Twante Canal is the most important. It has been widened and improved and is freely used by rice traffic while the Pegu-Sittang Canal now mainly is utilised by timber rafts. The third canal, the Sittang-Kyaikto, has become inoperative since the construction of the railway to Martaban. To sum up, at the beginning of the present century the communications of Burma consisted of about 1,100 miles of metre gauge railway line and 8,000 miles of roads of all classes in addition to the inland waterways. Within recent years, there has been a great advance in railway construction and the mileage is now approaching 2,000. Rangoon is connected by railway with Moulmein, Bassein, Mandalay, Myingyan, Heho in the Southern Shan States, Hsipaw and Lashio in the Northern Shan States, with Myitkyina in the extreme North and with the Lower Chindwin district. There are now about 10,000 miles of roads. The great difficulty in the maintenance of roads in Burma is the scarcity of metal in Lower Burma and the rapid deterioration of timber bridges which were used in the earlier days. A special sub-committee appointed in 1920 to examine road proposals for the province recommended an expenditure of no less than eight crores of rupees and these recommendations have been accepted by the local Government. The general financial situation also has considerably curtailed development and a great deal more expenditure has been incurred on maintenance and repairs than on original works. This may be seen from the fact that for the decade ending 1910 the average yearly expenditure on roads was only 18 lakhs for original works and 21·2 lakhs for repairs and for the decade ending 1920, 18·8 lakhs for original works and 33 lakhs for repairs. In 1919, 75 lakhs were specially allowed for expenditure during the next three years on road improvements and in 1922 Rs. 244 lakhs were earmarked from the profits derived from the rice control scheme to be spent in conferring permanent benefits on the agriculturists of the province.

Since 1923 a Communications Board, which has been given powers of administration, was formed for the province and since then there has been a distinct forward movement in the matter of communications. It has considered 241 projects and approved of work estimated to cost 467 lakhs. The most important work sanctioned is the programme of trunk road construction which is to be completed in 1931. An important link in this chain of trunk roads is a bridge across the Irrawaddy at Sagaing, and it is understood that the sanction of the Government of India has now been accorded to its construction. This will link up the east and west banks of the Irrawaddy. Since the appointment of the Communications Board the expenditure for the seven years ending 1926-27 has increased to an average of 43 lakhs on original works and 43·5 lakhs on repairs. The expenditure for 1926-27 on provincial main

roads alone has been 57·2 lakhs on original works and 38·9 lakhs on repairs. Of the 10,000 miles of road in the province, 6,000 are main roads which are maintained by the local Government and 4,000 miles are maintained by local authorities as district roads. Up till 1923 the Public Works Department was responsible for the maintenance of district roads, but since the passing of the Burma Rural Self-Government Act, this responsibility rests with district councils or with deputy commissioners in areas excluded from this Act. Where local authorities have not an adequate staff and plant, the Public Works Department undertakes maintenance of the roads. It is estimated that to maintain these district roads at their present standard Rs. 27¾ lakhs is required annually and to this the local Government makes a contribution of 17 lakhs. In order to prevent works being carried out by any district council which are beyond the financial capacity of such district council to maintain, the local Government has limited the capital expenditure on district roads to Rs. 6¼ lakhs per annum and contributes the funds for other approved works which are carried out by the Public Works Department.

In common with other provinces of India, the advent of the motor-car is making itself felt in Burma and the number of motor vehicles imported into Burma during 1926 was no less than 2,664. Wherever a road permits of it, motor bus services financed privately are immediately started to connect the surrounding villages with the nearest town, steamer or railway station.

It may be of interest to note the principle that is being followed in the construction of new main roads. Where possible these follow the general alignment of established cart tracks, but when they run in the same direction as a railway they are generally constructed within two miles of the line and parallel with it, now on one side, now on the other, and crossing the railway at the principal towns or at suitable points about every tenth mile. They thus form lateral feeders to which subsidiary feeder roads of reasonable length may be constructed on either side of the railway to connect with the principal stations, and without such subsidiary feeders having to pass over or under the line. Main roads are from 22 to 24 feet broad, the central 12 feet being metalled with stone, and permanent bridges are now being put in with a 16 feet broad roadway capable of taking a weight of 12 tons. The cost of construction varies from Rs. 30,000 to Rs. 50,000 per mile according to whether stone and laterite are obtainable locally and the cost of maintenance varies from Rs. 1,500 to Rs. 5,000 per mile. Under the direction of the Communications Board and subject to the possibility of providing finance, an extensive programme of road construction in all districts on a definite plan has been initiated and is being rapidly pushed forward.

Marketing

Marketing in Burma presents no particular features. The chain is from the small village broker to the local dealer residing in the surrounding markets and milling centres and thence to the small local mill or the

large rice mills in Rangoon. Formerly, it was the custom for these large Rangoon mills to give advances to their brokers to enable them to purchase paddy in bulk but it is understood that this custom has now been discontinued.

When a cultivator has threshed and winnowed his paddy, he sets aside enough to pay his land revenue if he is a landowner or his rent if he is a tenant. He then pays his hired labour and any advances he may have taken towards the expense of raising the crop under disposal. He then sets aside his *wunsa* or the amount which he calculates will be necessary for his domestic purposes for the year and the remainder he holds ready for sale. If a small man, he deals with the local village broker who arranges for its transport to the large broker at the local railway station or river siding. The ruling prices in Rangoon are generally well known in paddy producing tracts and the cultivator seeks, by bargaining with the broker, to obtain a price as closely approximating to the Rangoon level as the broker may be willing to concede. Another matter of dispute is the basket with which the paddy is measured, for the basket varies from village to village in the most extraordinary degree even within a radius of five miles. As a rule, however, an amicable settlement is arrived at and there are few cases of serious dispute. Occasionally, the cultivator gets the advantage of carting his own paddy for which he is paid cart hire.

When the paddy has reached the large broker various things may happen. If the broker is not working in direct arrangement with a Rangoon mill he may store it in his own godowns for a rise in the market. Large ranges of these buildings will be seen at all the principal railway stations and at many of the river sidings in Burma. If he adopts this policy he can hold the crop for a rise in price, or, in other words, speculate on the market. If he does not incline to speculation he can dispose of the paddy at once to the numerous local small rice mills which within recent years have sprung up in formidable numbers all over the delta or he may forward it at once to the large rice mill in Rangoon. The produce of the small mills either finds its way to Upper Burma or is sold in the neighbourhood of the mill or it may be sent after milling to Rangoon where it is handled both by the brokers and by the large shippers, in the latter case being frequently re-milled. Another industry which has sprung up within recent years and which is mainly in the hands of the small millers is the parboiling of rice for the Madras and Ceylon markets.

The bulk of the crop, however, is dealt with by large mills in the ports of Akyab, Bassein, Moulmein and Rangoon. These mills classify paddy by the somewhat artificial distinction of rail and river paddy which so far as they are concerned merely means the route by which the paddy arrives, although in actual fact there is a slight difference in the quality and class of paddy carried by the different routes. Rail paddy, as a rule, is a short-lived variety and slightly inferior to the boat paddy, which is a long-lived variety. This latter has the advantage that it has generally been put straight from the threshing floor or river siding into

the paddy boats and is therefore cleaner and has suffered less from adulteration.

All the large rice mills have their sidings or jetties and at these the paddy is delivered to the mill from the railway or from the country boat. In Rangoon the method of purchase is on the basis of a 9 gallon basket weighing 46 lb., a bonus being given for weight in excess of 46 lb. and a proportionate cut if the paddy weighs less than 46 lb. There are numerous complaints of collusion between the weighmen, the broker and the tally clerk but these are not serious. It may be remarked that a considerable amount of skill can be exercised in measuring paddy as paddy lightly dropped from a height into the weighing basket may weigh considerably less, bulk for bulk, than does a basketful closely filled and pressed down, but the paddy seller as a rule is no fool and is quite capable of looking after his own interests. There are of course numerous cases of theft from wagons or boats while in transit or while stored on the threshing floor and at railway sidings, but this is a feature by no means peculiar to Burma. There are also constant complaints of the lack of supply of railway trucks but, as a rule, the railway administration does all it can to deal with the crop at the rush period.

The marketing of cotton is not quite so satisfactory. As a rule, this crop is grown by a small cultivator who is generally in financial difficulties. In some cases, if his debts are considerable he finances his agricultural operations on credit and on the arrangement that he repays in *kapas* when the crop is plucked. Naturally not much is left to him by the time his crop matures. If his indebtedness is not so acute and if he can finance himself until the picking season he may still have to have recourse to the village trader for money to tide him over and here again the arrangement is to repay the cash loan in *kapas* at a fixed market price. This fixed price, it is to be feared, is generally in favour of the trader and the price must cover the interest on the loan and the risk taken. It is only in rare cases where a cultivator can refuse financial help altogether that he gets the full benefit of his crop.

These arrangements have far-reaching effects, not the least of which is the agricultural disability created. Instead of being able to keep their best seed, these cultivators have to hand over their whole crop to the trader and to buy back from him any seed which he likes to supply. As a result, it is seed of bad germination and mixed seed that comes back to the cultivator and the efforts of the Agricultural Department to improve the crop are, for that reason, handicapped. It is unfortunate that in cotton there is no free market. The cultivator is, in the first place, in the hands of the trader who does not deal with large ginneries direct but works through a broker and thus there is a long chain between the field and the mill, which militates both against the cultivator and against the efforts of the Agricultural Department to improve his crop. The Agricultural Department has attempted to open cotton markets as recommended by the Indian Cotton Committee, but it is understood that no great success has so far been achieved.

The other commercial crop of importance is groundnut and the eccentricities of this market are graphically described by Mr. Chalmers,

Development Commissioner, in a memorandum submitted to the Commission from which the following is an extract :—

" The cultivator in marketing this crop is less well organised than in the two crops already discussed. The main markets are on the river bank from Pakokku to Allanmyo. The Magwe market, which is probably the worst from the cultivator's point of view, may be taken as a sample of the seller's experience in disposing of his crop. The cultivator arrives in Magwe—generally overnight in order to save his cattle travelling in the heat of the day—he puts up at the compound of his broker and early in the morning the local buyer appears on his bicycle and bargaining begins. The buyer examines the consignment and depreciates it as much as possible ; the broker, if he is honest, holds a brief for the cultivator,—by repute he seldom is—his bias is towards the buyer with whom he has many transactions, whereas he sees the seller but once a year. If a bargain is struck, the cart of nuts is chalked, and proceeds to the buyer's godown or dump. Here the usual chicanery takes place. The nuts are delivered on a weight *cum* volume basis. The baskets vary considerably at the various stations. The Rangoon basket is supposed to weigh 25 lb. and the prices advices are on a F. A. Q. standard. The buyer's measurer takes over on a Magwe basket heaped, which normally weighs 37 lb. If the Rangoon quotation is, say, Rs. 180 per 100 baskets the Magwe buyer adds to this fifty per cent to cover the basket difference, and deducts Rs. 50 the freight charge to Rangoon to get a starting price ; whatever he is below this is gain—gain of a perfectly legitimate kind: but it is at this point that the cultivator is skinned. From time to time a basket is weighed and should it fall below 37 lb. a cut is made on the price of the consignment. No bonus is given for an excess in weight as in the case of paddy. The basket is heaped up with nuts and may be pressed down or shaken. In the latter the weight may go up as high as 40 lb. per basket, and the loss be as much as eight per cent of his crop. The nuts spilled are the perquisite of the measurer; in a morning's weighing this may amount to something considerable as any ' broken basket ' is also his.

The cultivator is but a child in the hands of the broker and the measurer. If he attempts to adulterate his nuts with husk or shell, he is caught out when the basket is weighed, and the cut is sufficient to cover the buyer's probable loss. Shingle added is easily detected. Watering when the nuts have to travel a long way so that there is time to absorb it, and steaming for quick absorption of weight are resorted to ; but the buyer and measurer meets this every day and can soon detect ' doctored ' nuts. These are the difficulties of the cultivator when the deal is on the straight. What are his chances when the broker takes secret commission, the measurer is a rogue, and the weight false ? For the present indifferent methods the cultivator has himself in part to blame. He has but to organise and he can dictate his own terms provided they are reasonable. He could, if he had sufficient intelligence, less suspicion, and any power to combine, market his produce in an open market, where prices would be known daily on advice from Rangoon, sell by weight which is the best test of good nuts, unless we are going to test for oil content and have proper

stamped scales and a neutral weighman. Until this is done there can be little improvement in the market conditions. To summarise: the ideal we ought to struggle for is :—

(1) an open market with daily market prices published (elimination of the broker) ;

(2) sale by weight with a bonus for consignments over F. A. Q;

(3) genuine weighment by neutral tallymen,

The first two can be accomplished if the cultivator through his societies will combine ; but strange to say Magwe district is one of the areas where co-operation has not taken hold.

The third is a difficulty, as honesty is a rare quality, and where it does exist it is apt to be destroyed by the seller or buyer bribing the man appointed to give them a square deal.

The cultivator has been done so often, that he is a bundle of suspicions: the better the plan devised for his good, the more suspicious he becomes: the fact that he cannot detect a catch in a good scheme only confirms him in his belief of the cunning used to invent it. He will in most cases have none of it ; if he does come in, he comes in with the intention of perverting it at the earliest opportunity. Arcadia only exists in the imagination of the poets. The agriculturist enjoys 'slim' practice so long as he is not the victim. Buying by weight is steadily gaining in favour and the other riverine markets have adopted it. Magwe will in time follow. The question of freight has not been examined : but Rs. 50 for the freight of about $1\frac{2}{3}$ tons of nut from Magwe to Rangoon appears to be excessive ; the crop is a bulky one and takes up much space. The Myingyan method of dealing with the nut is more economical. The oil is pressed, the shell burned, and the cake resulting is in the best form for transport. The oil can be disposed of in the province, and the cake exported for cattle-feed. Perhaps the line of advance here is the small mill ; but the difficulty is to deal with the by-product, the cake in a small unit : it means expensive hydraulic presses and good marketing facilities for the oil and cake if the venture is to be a success."

With regard to the marketing of cattle, this also is somewhat haphazard and there are no real stock markets in the province. As has been pointed out, the dry zone is the great breeding centre of Burma and the animals from this area are drifted down the river on rafts, marched down by road or conveyed by train to Lower Burma. There is a kind of cattle market at Allanmyo in the Thayetmyo district on the east bank of the Irrawaddy and this has attained some reputation and is fairly successful. Should sales not be effected there, the cattle continue their march south to Paungde in the Prome district where a considerable business is also done. Pyawbwe in the Yamethin district is also a large cattle dealing centre where many cultivators go to buy their supplies, but the markets are not organised or controlled. The ordinary vendor of cattle is the cattle breeder who has his own stock to dispose of, buys a few from his neighbours or is entrusted with the sale of others and starts off on his march southward selling as he goes. The other dealers are large buyers from Lower Burma who go to cattle breeding centres buying from village to village and on their return disposing of the animals in their own local

areas in Lower Burma. It may be remarked that a considerable number of cattle also come in to the more eastern districts of the province from Siam and the French States.

13. LOCAL SELF-GOVERNMENT.

Local self-government in the sense in which it is known in other parts of India only came into effect with the passing by the local legislature in 1921 of the Burma Rural Self-Government Act. This enactment provides the basis for the education of the rural population in the responsibilities of representative institutions by transferring the administration of local matters outside municipalities, including vernacular education, from purely official control to elected councils and boards, such local bodies being, as far as possible, neither assisted nor controlled by government officers. Prior to this the only suggestions of local self-government in the accepted sense were municipalities of which, as a rule, the deputy commissioner was president with an official or non-official vice-president and in the smaller towns, town committees. Outside these areas rural administration was regulated by the Burma Village Act administered by village headmen and village committees. Prior to its amendment in 1924 the village headman was practically all-powerful within his village tract, but since that date some of his powers have been transferred to a village committee, especially in connection with the trial of civil and criminal cases. Under the Act, it is the duty of the headman to report certain matters to the officer in charge of the nearest police station, for instance, the arrival in his village of any suspected criminal, the committing of or the intention to commit various major offences, the occurrence under suspicious circumstances of any death in his village tract and any matter likely to affect the maintenance of order. His main duty however is the collection of the revenue of his tract and the general supervision of his village. Rules have been made under this Act prescribing the duties of the headmen of village tracts in respect of contagious or infectious diseases among human beings and it is also under this Act that are defined the duties of the headman and residents of a village tract in respect of the prevention and suppression of cattle disease. These undoubtedly have formed a very powerful assistance to the Veterinary Department.

With regard to the Burma Rural Self-Government Act, 1921, this Act provides first for the creation of circle boards and secondly for district councils. So far, however, the only functions definitely assigned to circle boards are the election of members to the district councils and the submission of an annual statement of their requirements and estimates of expenditure for the coming financial year. Other functions can be exercised only on the transfer of any matter by the district councils under Section 53 of the Act and, in general, district councils have made no complete delegation of the control and administration of any matters to the circle boards. A further delegation would be from circle boards to village committees which are contemplated in the Burma Village Act as amended in 1924, but since the circle boards have had no functions

delegated to them which they can delegate in turn to village committees under Section 25 of the Burma Rural Self-Government Act, 1921, these committees cannot yet take any place in the scheme of rural self-government as dealt with in the Act. And indeed so little has been delegated to circle boards that they are practically moribund.

It is too early as yet to say what success will attend these councils as they only really came into effect at the end of 1923, but there is no doubt that at present they are suffering from lack of trained secretaries, engineers and other staff, while the inexperience of the members is also an obstacle to rapid advance. It thus follows that in the meantime a large number of duties are performed as they were before the introduction of the Act, for instance, village headmen continue to have duties in respect of public health and the health of cattle in subordination to the district officers of Government and independent of the new local bodies and the Public Works Department does a considerable amount of their road construction and maintenance. These difficulties, however, are merely temporary and will disappear as experience is gained.

The total provincial contributions to district councils during 1925-26 was Rs. 31,04,279. Of this total Rs. 15,93,209 was for education and Rs. 16,11,070 for general purposes*. The total receipts of district councils (excluding revenue, balance and debt) were Rs. 81,58,687 and their payments (excluding debt) Rs. 71,97,306.

14. PUBLIC HEALTH AND SANITATION.

As a rule, the Burman is vigorous, healthy and active; and although rice is the staple food the population does not suffer from the deficiency of diet which seems to depress other rice-eating groups of India. This is probably due to the fact that his diet is varied and that, even in the poorest household, salt fish forms an integral part of the food ration. In addition, a very large amount of country vegetables and roots are consumed, while the fact that the preparation of the raw paddy in the village hullers does not lead to high polishing or the removal of nutritive portions of the rice probably contributes to the soundness of the diet. In the more congested parts of Lower Burma, however, the very large influx of Indian immigrants, who in 1925-26 numbered no less than 408,464, tends by the somewhat lower standard of living of these immigrants to depress the average level of nutrition, while there is no doubt that by this same agency a considerable amount of disease is introduced and spread. That the Burman is on the whole better fed than the other races of India may be inferred from the expectation of life figures which were worked out for the 1911 census: these enquiries gave an expectation of life for a Burman male as 31½ years and for a female 32½ years, figures which are only approached by Madras where the expectancy of life for males is 26 and females over 27½. In other provinces the figure is about 21. Added to this is the fact that, except in the largest cities, there is very little congestion of population

* Of this sum Rs. 10,93,632 was for public works, Rs. 2,35,696 for public health and Rs. 2,39,146 for medical purposes.

as Burma is much underpopulated, the average density of population per square mile being only 68, the next province being the Central Provinces with 139 to the square mile, rising to no less than 608 persons to the square mile in Bengal.

Burma is subject to diseases similar to those which work havoc in India and amongst the most important of these and by far the dominating disease is fever in one form or another. When we consider that for six months of the year, the delta of Lower Burma is practically entirely under water and that for months afterwards shallow pools are left scattered about the country—most suitable breeding grounds for mosquitoes—it is not to be wondered at that a large number of the population are constant victims to malaria. This liability to malaria undoubtedly reduces the working efficiency of a large part of the rural population. Plague is now more or less established in the province, principally in Rangoon from which it is liable to be disseminated up-country. Cholera outbreaks are frequent and there is a considerable amount of small-pox. Hookworm disease is also unfortunately present, though so far it has not proved serious.

As regards hygiene, the Burman is by habit scrupulously clean and the houses are as a rule also kept in a tidy and orderly manner. There is, however, a tendency to carelessness in the village surroundings and the general custom of keeping the cattle in villages at night as a protection against cattle theft does not tend to improve matters. Wells and drinking tanks are apt to be neglected and the ideas of rural hygiene may be said to be of the most primitive. It may be remarked, however, that as in the delta the population lives in houses surrounded by water for a considerable part of the year, it is not easy to attend to matters of village hygiene though it may also be hoped that the thorough cleansing with water which the villages receive during this period may do something to remove accumulations of filth and refuse.

Within recent years, the Public Health Department in Burma has been very substantially strengthened and during the year 1925-26 the total amount spent in the province on civil sanitary works was Rs. 54·37 lakhs, of which Rs. 18·64 lakhs were devoted to water supply and Rs. 19·8 lakhs to conservancy. In the towns and municipalities the percentage of income spent on conservancy was 6·01 and on water supply 5·87 and the total expenditure on sanitary works was Rs. 49,72,000. But the department is by no means strong enough to deal with the great problems of the country. At present it consists only of the Director with two assistant directors, and in most districts the civil surgeon combines with his duties as medical officer those of district health officer. Recently sixteen Burman sub-assistant surgeons have been placed at the disposal of the Public Health Department but this number must be very much increased if any impression is to be made on the province. A Public Health Institute has been opened in Rangoon and doubtless, with this provision for training, the staff of district health officers will in due course be largely increased.

In conclusion, it may be remarked that very considerable improvement has been effected in the sanitary condition of some of the larger

riverine towns of the delta by raising their level. This has been effected by pumping up sand by dredgers from the adjacent rivers. In some cases this has been accompanied by a new lay out of the towns and in these areas the general health has been materially improved.

While the expansion of medical relief has gone on rapidly and there is now practically one medical institution for every 794 square miles of country and for every 45,000 of the population, these schemes hardly touch the needs of the rural population as the hospitals are in the main located in the towns. A scheme has, therefore, been drawn up by which private practitioners and retired sub-assistant surgeons are given a subsidy of from Rs. 50 to Rs. 125 per month provided they will settle and practise in smaller towns where no hospitals or dispensaries exist. At present 13 such practitioners have settled down to practice, apparently with considerable success, and arrangements are being made to extend this scheme and obtain more medical men on these terms. In time it is hoped that by this arrangement modern medicine will be brought within the reach of a greater part of the population, at present dependent on the indigenous Burmese medical practitioners who, as in almost every country, have a large following. Government has devoted its attention to this type of practitioner and schemes for training have been originated which will enable him to bring to his indigenous theory of medicine at least the principles of cleanliness, asepsis and the application of antiseptics.

MINUTES OF EVIDENCE

TAKEN BEFORE THE

ROYAL COMMISSION ON AGRICULTURE.

Wednesday, November 2nd, 1927.

RANGOON.

PRESENT:

The MARQUESS OF LINLITHGOW, D.L. (*Chairman*).

Sir THOMAS MIDDLETON, K.B.E., C.B.
Sir JAMES MACKENNA, KT., C.I.E., I.C.S.
Mr. H. CALVERT, C.I.E., I.C.S.
Raja Sri KRISHNA CHANDRA GAJAPATI NARAYANA DEO of Parlakimedi.
Professor N. GANGULEE.
Dr. L. K. HYDER.
Mr. B. S. KAMAT.

Mr. H. O. REYNOLDS, I.C.S.
U BA CHO.
} (*Co-opted Members*).

Mr. J. A. MADAN, I.C.S.
Mr. F. W. H. SMITH.
} (*Joint Secretaries*).

Mr. A. McKERRAL, M.A., B.Sc., I.A.S., Director of Agriculture, Burma.

Replies to the Questionnaire.

QUESTION 1.—RESEARCH.—(*a*) (*i*) Agricultural research in this Province is conducted (1) at the Agricultural College, Mandalay, and (2) on the experimental farms of the department. The research at the college is in connection with soils, plant-breeding and other crop problems—mycological, bacteriological and entomological. The research on the farms includes research into rotations, tillage methods, the adaptability of new crops for particular localities, manures and plant-breeding. In the past, the research officers at the Agricultural College have been allowed to work independently but recently powers have been granted to the Principal to call for monthly reports of work done and to hold a monthly meeting of the other experts with a view to co-ordinating the work.

Most of the plant-breeding work falls on the Deputy Directors as the subject is too wide to be dealt with by one Economic Botanist at the College. On the whole, I consider the present system satisfactory except that the training in plant-breeding given at the various agricultural institutions in Europe is not sufficient to enable Deputy Directors to begin straightaway on their arrival. Most of them have to learn the methods on the spot.

In the case of the planting industry, I consider that this should pay for its own research by an increase in the export duty on rubber. I understand that the Development Commissioner is making proposals to this effect.

(*ii*) Up to date there has been no veterinary research worth the name in this Province. Government has recently, however, endeavoured to recruit two research officers, one for cattle and one for elephants. These officers, if recruited, will work at the new Veterinary College at Insein. There is, I consider, a great field for veterinary research in Burma. The laboratory provision at the new college at Insein should be sufficient for the present.

(*b*) I wish to refer here to the manner in which so much of the time of research officers has to be taken up in teaching duties. I would willingly see research and teaching completely separated. This, however, is scarcely practical polities at the present moment and the only way out of the difficulty is to provide the superior officers concerned with as strong an assistant teaching staff as possible.

(*c*) I suggest the following:—

(1) Research into the possible economic value of wild plants. I believe that in a Province with so much waste land and forest land as Burma there are still many wild plants which could be domesticated and put to use, and that there are many wild products of which an examination with reference to their industrial value would be useful.

(2) Research into the cold storage of Indian and Burma fruits. Fruits like the mango, mangosteen, *litchi*, *sapodilla* and others would, it is certain, find a ready market in Europe if they could be shipped there without being damaged. Even in the case of the internal markets these usually exhibit a period of glut followed by a long period of scarcity. This is the kind of research that the central station at Pusa might profitably take up.

(3) Research into the prevention of insect attack on ship-board. The damage done yearly must be very great. There is one type of bean of fine eating quality grown in Burma which cannot be exported for this reason. What is required here is the collaboration of the experts of the Agricultural Department with some shipping company.

(4) Research into the curing of the tobacco crop. At present Indian and Burma tobacco is of such poor quality that it cannot be marketed in the British Isles. The last Board of Agriculture held at Pusa considered this matter and made proposals.

(5) Horticultural research has not in the past received the attention it merits. A horticultural section should be opened at Pusa.

QUESTION 2.—AGRICULTURAL EDUCATION.—(*i*) Agricultural education in Burma is provided for by—

(1) the Agricultural College at Mandalay which is mainly occupied in training staff for the Agricultural Department;

(2) an agricultural middle school conducted by the American Baptist Mission at Pyinmana and subsidised by Government. This is an attempt to combine agricultural instruction with the ordinary curriculum of standards fifth to eighth. The school has at present about sixty pupils and the first batch has just graduated. It is too early yet to state whether this kind of school is likely to have any vocational use or not and the enterprise must be regarded for the present as an experiment.

Instruction to adult cultivators is given at most of the central farms of the department. Up till now this has been purely practical and conducted by the superintendent of the farm in rather a haphazard manner,

Recently, however, an attempt has been made to systematise it by the creation of farm schools with a graduate in charge of each and two of these with about ten pupils in each have now been started as an experimental measure at the central farms at Hmawbi and Mahlaing. The course is for one season only and small stipends are paid. I think that this type of school, if it could be extended to the villages, has decided possibilities.

(*v*) The only incentive at present for lads to study agriculture is the hope of getting a post of some kind. Students of the Agricultural College who are successful in the final examination are all practically certain of getting posts in the department and the graduates of the Pyinmana Agricultural School appear to be also quite keen to get fieldmen's posts in the department or other Government posts.

(*viii*) I consider nature study and school plots to be useful aids in the development of intelligence and therefore very useful adjuncts to the ordinary literary curriculum. I do not think that they have any direct vocational value. I do not consider that school farms would serve any useful purpose in this Province. If their aim is to be educational that aim can be equally well met by the provision of nature study and school gardens at very much less expense. If their aim is to be vocational that aim can be much better met by the practical demonstration work of the Agricultural Department. The two main objections which I see to school farms are, firstly their expense and, secondly, difficulty of getting a sufficiently large number of teachers qualified to teach anything useful connected with agriculture.

(*xii*) I believe that the method of farm schools which we are experimenting with is on the right lines. These schools will give short courses in arithmetic, nature study, elements of surveying and practical agriculture, the course varying according to the needs of the locality. The idea might be extended to continuation schools, run by the Education Department or Agricultural Department if necessary, where instruction would be given for, say, nine months of the year while during the remaining three months the teacher or teachers would tour in the school constituency giving lectures, lantern demonstrations, etc. The first thing to be attended to, however, is the improvement of ordinary elementary education. The teaching in the Buddhist monasteries is of a very meagre nature and consists mainly in imparting the rudiments of reading and writing. Arithmetic and geography are either not taught at all or taught badly.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(*a*) The Agricultural Department in Burma has made use of the following methods with some considerable measure of success:—

(1) Actual demonstration on the fields of the cultivators. This I consider to be the best method.

(2) Holding short courses for cultivators at the central farms.

(3) Peripatetic lecturing by the staff.

(4) The holding of agricultural shows.

I am not in favour of special demonstration farms run by the staff of the department because they are always subject to the criticism that Government being possessed of better means is capable of doing things of which the ordinary cultivator is incapable. It is another matter when the people of a village see a piece of work carried out by one of themselves with his own bullocks and labour. The improvers of British agriculture like Coke of Norfolk found this to be true in the England of their time.

(*c*) The farm schools mentioned above are meant to give training to young men who will go back to their villages with a knowledge of what the department is doing and spread that knowledge among their fellow villagers. There is no doubt that this method is a useful one and I have found it so in the past provided always that the right kind of youth is obtained but sometimes the person sent is the ne'er-do-well of the village whom the headman is glad to get rid of for the time being. In the past we have issued a considerable number of leaflets in the vernacular and the staff of the department are encouraged to contribute articles on agricultural subjects to Burmese newspapers. These are all methods capable of yielding results.

(*d*) In Burma we can instance—

(1) the spread of groundnut cultivation from zero to over 400,000 acres in the last twenty years;

(2) the complete replacement of the variety of gram previously grown, which was badly attacked by a fungus disease, by a new variety immune to that disease. The distribution of the new variety has also had the effect of increasing the area under gram from 62,375 acres in 1921 (the year in which the distribution of the new variety began) to 199,558 acres in 1926-27;

(3) the increase of potato cultivation in the Shan States. The value of potatoes exported from Rangoon rose from 2.07 lakhs in 1916-17 to Rs. 20.03 lakhs in 1925-26;

(4) the spread of improved rice varieties on at least 200,000 acres.

In all these cases success has been achieved because the new seed filled a market want and was a source of immediate profit to the cultivator. The novelty was something which he could easily understand and which was capable of being brought into his ordinary practice without any extra expenditure of capital.

In the particular case of groundnut this plant had been grown in various small areas for many years in Upper Burma for internal consumption only. Its rise to importance in the economy of the dry zone was owing to the opening of ginning factories for cotton which were equipped with machinery originally intended for the extraction of cotton seed oil but which it was found could deal with groundnuts as well. The crop also is hardier and more drought-resisting than sesamum which it largely replaced.

In the case of gram, the crop is grown on low-lying areas many of which are too flooded during the rains to allow of a crop at that time. If the early and late rains both fail, the chance of a crop on these low-lying fields, as in certain parts of the Sagaing, Shwebo and other dry zone districts, is the cultivator's last hope for the year, his endeavour being to get a crop of either wheat or gram. The old gram variety could never be grown for more than one year on the same soil and even in the first year was often destroyed by disease. The introduction of the new immune variety conferred, therefore, very great benefits on the cultivators in these localities; hence the reason for the increase in the area.

The increase in potato cultivation in the Southern Shan States is due to two main causes, *viz.*, the distribution of new Scotch potato seed from the experimental farm at Yawnghwe resulting in the production of potatœs of excellent eating quality much in demand in Calcutta and (2) the extension of the railway to Heho in the Myelat area where the potatoes are grown.

In the case of paddy varieties, these not only fetch premiums on account of quality but have also been selected for yield. A fair average claim for the improvement effected would be Rs. 7-8 per acre, Rs. 3 being on account of premium and Rs. 4-8 on account of improved yield.

QUESTION 4.—ADMINISTRATION.—(*a*) The present position is that agriculture is a Transferred Subject in all the Provinces, and accordingly, except in such matters as all-India and inter-provincial legislation, the Central Government has ceased to have any control, administrative or executive, over provincial departments. The relationship between the central and provincial departments in India is, therefore, somewhat analogous to that between the Federal and State departments in the United States of America, although the analogy between the two cases should not be pushed too far. India is a comparatively poor country while America is the richest country in the world. Still the American system will repay study and is perhaps the best model for our guidance here.

Following the American system, I would have a strong central department manned by the best recruits available in Europe for whose recruitment the present Indian Agricultural Service should be maintained. The Pusa Institute should continue and be extended to include extra sections on (1) agricultural engineering, (2) horticulture, and (3) economics and statistics, while the present section in botany should be enlarged to provide sub-sections for each of the more important crops which are of

all-India importance, *e.g.*, tobacco, cotton and probably rice, I would also attach to this section one or more plant explorers who would, as in the case of the United States of America, be allowed to travel to foreign countries for the collection of valuable new crops or new varieties. The sections should be engaged not only in research but also in the collection and dissemination of information. The section of economics and statistics should prepare a comprehensive Year Book dealing with all aspects of Indian agriculture. This section should also in collaboration with Provincial Governments edit and publish a series of bulletins which would set forth in a readable form the salient features of Indian agricultural statistics, *e.g.*, the variation in the size of the holding, the size of the worked area, the incidence of population on the soil, etc., from Province to Province. The section on engineering should be manned by a first class mechanical engineer with experience in agricultural engineering who would make full researches into the problem of improving agricultural field implements and designing new ones.

The transfer of authority in the Provinces to Ministers of Agriculture has as a corollary that the role of the central department in its relation to provincial research must be entirely co-operative. Much, however, could be accomplished co-operatively on the lines already begun in the case of cotton, sugar and animal husbandry, by the Government of India running special stations in the Provinces for crops of all-India importance.

The Agricultural Adviser should be retained and his influence and authority strengthened by making him a Secretary to Government. The Directorship of Pusa should be a separate post, the officer filling it to be one who has had provincial experience and who could accordingly act as an efficient liaison officer between the central and provincial departments. He should not be a merely sedentary specialist appointed on grounds of seniority only, but one who has had the experience necessary to visualise provincial needs and the practical sense to direct experiment in fruitful directions.

The central department should have funds and staff to fill the role described above and its staff and work should form models for provincial departments. There is good authority for the belief that the scientific standard of Pusa has fallen in recent years, and yet during the first fifteen years of its existence its publications were regarded throughout the English speaking scientific world as of a very high standard. Its former prestige should be restored. The necessity for a strong central department has never been more apparent than at the present time.

(*c*) (*i*) Both the Agricultural and Veterinary Services in Burma are at the present moment understaffed, the former mainly in its subordinate grades and the latter in the superior service. Considerable difficulty has been experienced in getting the right type of recruit for the Agricultural College, the main cause of the difficulty being that it is not possible to give to Agricultural College graduates the same emoluments as they get after a course in Forestry, Engineering or Medicine at the University. This is due to the fact that our present provincial service has only 19 posts in the cadre and therefore must be regarded as a selection grade of the subordinate service. College graduates must enter the latter first on a pay of Rs. 150 while on probation for two years and Rs. 160 on confirmation, rising by annual increments of Rs. 7-8 to Rs. 220, and then by increments of Rs. 10 to Rs. 300, with an efficiency bar at Rs. 220, while Forest graduates are taken directly on to the Provincial Service scale of Rs. 300—25—800. I consider that the Subordinate Agricultural Service should be made more attractive and that this should be done by raising the scale of pay to that given to members of the Subordinate Civil Service who, although their education is not superior to that of agricultural graduates, are on a scale of pay of Rs. 200—10—300—25/4—325—25/5—350. If the Agricultural Service is to function properly in the future, it will be necessary to attract to it the very best type of young Burman, and, as the work carries with it little or no reward in the shape of social prestige, the pay should certainly be not less than that of the Civil Service. This view, I believe, was held by Sir Reginald Craddock.

There is not at present proper correlation between the Agricultural and Veterinary Departments on the one hand and those other departments

which must also play a part in rural development and betterment, *i.e.*, the Co-operative, Education, Public Health and Irrigation Departments. In 1920 the post of Development Commissioner was created in Burma, the *raison d'etre* of the post being that the occupant, a senior civilian, would correlate the activities of those services and departments which were primarily concerned with rural development, *viz.*, the Agricultural, Veterinary and Co-operative Departments, and support their schemes before Government. I gladly admit that speaking for the Agricultural Department proper support has been given in full measure but consider that correlation has been insufficient. In the first place the whole problem was not properly envisaged in the beginning, for the Development Commissioner had no control over the Education, Public Health and Irrigation Departments and these latter are as closely concerned with rural matters as the three first mentioned. The arrangement besides is awkward; it places an extra office between the heads of the Agricultural and Veterinary Departments (both technical departments) and the Ministry with the result that the latter is not in direct touch with the heads of these departments. In view of this fact the heads of these departments rightly or wrongly consider that in Burma their appointments have been made inferior to the corresponding appointments in the Indian Provinces. I submit that this feeling is bound, sooner or later, to give rise to discontent and unrest in the services and to have an adverse effect on their recruitment. The creation of the post of Development Commissioner also virtually means that a Super-Director of Agriculture and Super-Veterinary Adviser have been created and the heads of the two departments do not understand why it should be necessary to appoint an officer to direct the Director and advise the Adviser if it is not necessary to do so in the case of other technical departments. There is a further difficulty which has not yet manifested itself. The incumbents who have up till now occupied the post of Development Commissioner for the longest time have both in the past been Directors of Agriculture and the smoothness and amicability which have up to date characterised the relations between them and the expert heads have been largely due to the personal factor and also to the fact that they had taken pains to understand the work of an Agricultural Department and, what is perhaps more important, to put themselves in sympathy with the work and aims of its members. The recent change of name from "Development" to "Financial Commissioner (Transferred Subjects)" would appear to indicate that the idea of development as one of the functions of the post has been given up and that in future the appointment will tend to go to the first senior civilian on the list who will be unlikely to have the knowledge and insight necessary to control technical departments like those of agriculture and veterinary. It is doubtless of great convenience to the Minister to have a senior civilian at his elbow and no one in either of the technical services concerned can possibly object to this; but his proper place, I submit, is within the Minister's secretariat as first secretary. This arrangement would retain all the benefits claimed for the appointment while at the same time it would abolish the extra post office (thereby simplifying and expediting the despatch of departmental business) and would also restore the *amour-propre* of the technical departments and services concerned.

To effect correlation we require, if a serious attempt at all-round rural betterment is to be made more than an individual appointment, some body—board, council or committee—is required comprising the heads of the Agricultural, Veterinary, Co-operative, Education, Public Health and Irrigation Departments in addition to others. It might be called the Board of Rural Development. It should be presided over by one or other of the two Ministers. At first its functions might be largely advisory but later it might be given a certain amount of financial responsibility and undertake the control of grants or loans for schemes of rural development.

(*c*) (*ii*) & (*iii*) There are two localities in Burma more or less isolated at present, *viz.*, the Provinces of Arakan and Tenasserim. The latter is by far the most important and possesses large areas of land still unoccupied which could be put under rubber and other plantation crops. The railway to Tenasserim goes only as far as Ye but it is proposed to carry it on to Mergui. From Mergui a link should be made across the Peninsula to the Siamese (Bangkok to Singapore) railway. This would link up Burma by rail with both Siam and the Federated Malay States and would also probably form a new railway route to China and the Far East. It would be to the great advantage of Arakan if one or more roads or railways were

made across the Yomas. Perhaps the easiest thing to do would be to make a good motor road from Prome to Taungup in the Sandoway district. In the matter of steamers Burma is very well catered for by the Irrawaddy Flotilla Company which, although it has a monopoly, has not abused it.

QUESTION 9.—SOILS.—(*b*) Most of the soils of the great paddy area of Lower Burma have actually been reclaimed from virgin jungle within the last seventy years. It cannot be said that they have suffered marked deterioration beyond the usual fall in yield which takes place when a soil originally virgin is cropped year after year with the same crop without manuring. A good deal of the rice area of Lower Burma must now have reached this constant yield stage, *i.e.*, the point beyond which the outturn cannot fall, at least in normal years. I do not know of any areas in Burma where the soil has undergone marked improvement unless by improvement is meant such operation as clearing, levelling or *bunding*.

(*c*) I know of no large areas of culturable land which have gone out of cultivation in recent times. I have often been told by cultivators that certain areas were uncultivated in Burmese times, but since the introduction of the settled conditions due to British rule, these areas have all been taken up again. There are, of course, small patches of land here and there which one finds fallow because perhaps a tank has gone out of repair. In such cases the Agricultural Department does what it can to obtain Government loans to have the work repaired. In Burmese times this was done by forced labour.

QUESTION 10.—FERTILISERS.—(*a*) A good deal of cattle manure is lost owing to the grazing of cattle on waste lands in the rice areas and the amount available is just about enough for the nurseries. Under present conditions it is not possible to make any suggestions for the improvement of this state of affairs. The making of artificial farm yard manure has been tried at Hmawbi and found not profitable. The practice of yearly tenancy or tenancies at will is against the careful conservation of manure, for a tenant who has to quit at the end of the year sees no particular reason why he should conserve his manure. I have actually found cases in the Pegu district where such tenants purposely built their cattle-sheds on the edge of a creek so that the manure which they considered to be a nuisance (and under such circumstances it is a nuisance) could easily be dumped into the stream. This state of matters may probably be remedied if and when the proposed tenancy legislation comes into force. The pernicious system of using cattle manure for fuel is not practised by the Burmese, but immigrant Indians remain faithful to it, although there is little need even on their part to practise it.

Of other indigenous manurial materials, there are certain deposits of bat's guano in caves along the Shan Hills and a certain quantity of prawn dust is exported from Lower Burma to the Straits. The amounts of these manures available are too small to have any marked effect on the agriculture of the Province. Lime in abundance and of good quality, (*i.e.*, free from magnesium) is also found.

(*b*) The remedy would be to introduce, when the time is ripe, legislation similar to that in England and other European countries. With such legislation and a strong Agricultural Department to take samples and make reports, adulteration could be made very difficult.

(*c*) The best means is to adopt a system of controlled demonstrations on the cultivators' own fields. This is being done at present on the Lower Burma rice areas in connection with the manure known as ammo-phos.

(*e*) Yes. At the Hmawbi Agricultural Station, which is fairly typical of the rice areas of Lower Burma, and at the Mandalay Agricultural Station which is typical of the irrigated rice land in Upper Burma, a five years' test was done during 1912-17. The results show that nitrates are not only ineffective but positively poisonous to swamp rice, that potash alone or in combination has no appreciable effect and that the best results are got by using phosphate in combination with ammonical nitrogen. Increases of the yield up to forty per cent at least were got by the use of sulphate of ammonia combined with phosphates, but in no case could the manures be made to pay. Calcium cyanamide which was also tried did not give results approaching that given by sulphate of ammonia. These experiments have

since been continued and further new manures have been tried including urea and ammo-phos. The latter, when applied at the rate of 100 lb. per acre, gave profits varying from eight to thirteen rupees per acre and this manure is being demonstrated on a fairly wide scale during the present year. The future would appear to be hopeful. The price of artificial manures is going down while the price of rice is going up and these conditions are likely to continue.

QUESTION 11.—CROPS.—(*a*) (*i*) Since the opening of the Agricultural Department in Burma the following crops have been placed under improvement: rice, cotton, beans, grams, chillies, groundnuts, sesamum, tobacco and *juar*. There is nothing to make us doubt that practically every important crop can be improved either by simple selection or by crossing and that this improvement leads to an immediate enhancement in the value of the crop to the cultivator. For the department's improved rices premiums varying from ten to twenty rupees per hundred baskets are freely given. In the case of a selected cotton, premiums of five rupees per hundred *viss* have been received. The improved gram variety will grow where the old variety wilted and died and has completely replaced the old variety, resulting in an increase in the annual value of the crop of at least five lakhs of rupees. In the case of the other crops, they are still under selection and are likely to yield corresponding results.

(*ii*) New crops, which have been introduced during the last twenty years, are groundnuts, covering 400,000 acres: Cambodia cotton, the area of which is still small but is increasing; rubber, 79,437 acres. Many new fodder crops including Guinea grass, Reana, Rhodes grass, Kikiyu grass, *berseem*, lucerne, etc., have been tried, but none of these have been able to find a place. In the dry zone, no fodder crop so far tried can beat the already existing *juar*. Generally speaking, we cannot hope for very much from the introduction of new crops. When a market has been established, it is advisable not to attempt to disturb it and the best line is the improvement of the existing crop.

(*iii*) An extensive scheme for the distribution of seed has been organised and is explained in the memorandum. At present, I can see no hope of this work being taken over by a private agency. The demand for improved seed and the consciousness of the need for good seed grain which exists in European countries do not yet exist here to any great extent and time is required to foster them.

(*iv*) The damage by wild animals in Burma is comparatively insignificant; when it does take place it occurs mainly on the land bordering forest areas where elephants, monkeys, pigs, deer and rats do a certain amount of damage. Cultivators in these parts are skilled in trapping wild animals and in methods of protection. Occasionally crabs—the raft crab which migrates from the sea to the paddy fields and back again—do a certain amount of damage to rice in the maritime districts. This pest, however, can be defeated by delaying planting till it has gone.

(*b*) There is no food-crop which, in yielding capacity, can take the place of rice, and rice is the staple food of most parts of Burma. In parts of the dry zone, millet (*juar*) seed is eaten alone or mixed with rice. This also is a very heavy yielding crop although the yield is sometimes reduced by a fungus attack. The department is at present demonstrating means to overcome this attack. On the whole, there is no lack of food-crops in Burma either wild or cultivated. We have two curious food-crops which I do not think are well known in India and might interest the members of the Commission. These are leguminous crops which are grown for their roots. The first is *Peseinsa* (pachyrhizus angulatus) which grows on the sandy upland soils of Lower Burma and also on the alluvial tracts of the Irrawaddy and other rivers. The other is known as *Pemyit* (psophocarpus tetragonolobus) and is often grown in the irrigated rice areas of Upper Burma. Both the roots and the pods of this plant are eaten. Since I came to Burma there has also been a large increase in the area under tapioca (cassava) on the sandy upland soils of Lower Burma. We have practically every known species of pulse, including the Rangoon bean which is an important article of commerce, and from the jungles are obtained an interminable variety of yams and other wild products which are made use of by the people.

QUESTION 12.—CULTIVATION.—(*i*) The department in Burma has not as yet had much success in altering the existing system of tillage. The difficulty here is that improvements cost money and sometimes time as well, and time is precious in a country such as the dry zone of Burma where the success of crops like cotton and sesamum frequently depends on the cultivator catching the first shower of rain. The Deputy Directors, however, have carefully studied the indigenous methods of tillage and with the collaboration of the Agricultural Engineer are attempting improvements. The main lines of advance would appear to be as follows :—

(1) The production of a plough which will efficiently prepare the land for paddy at one operation. Many European ploughs have been tried and attempts have also been made by European firms to adapt these to Indian conditions. All have had to be abandoned either because of their cost or unsuitability. A plough share has now been designed which can be fitted to the body of the Burmese plough and this appears to be proving a success. It costs only three rupees.

(2) The question of row-sowing of the cotton has been examined. The local practice is to broadcast. There is no doubt about the advantages of row-sowing but the cultivator's argument is that it takes too much time and too much labour in a Province where labour is not so abundant as it is in India. Progress in this direction is accordingly slow.

(3) The cultivation of the sugarcane crop has been carefully studied and there is no doubt that economies can be effected.

QUESTION 13.—CROP PROTECTION, INTERNAL AND EXTERNAL.—(*i*) & (*ii*) The Destructive Insects and Pests Act of 1914 is operative only between India as a whole and the rest of the world and affords no protection to Burma from diseases which might be imported from India. There are certain pests which India possesses and Burma does not yet possess and which it would be desirable to exclude, *e.g.*, the insect *chilo* which attacks *juar* and other grasses, another insect *emmolacra* which attacks sugarcane, and the stem borer of cotton. Doubtless the same may be said of the various Provinces in India. Madras, for example, may get disease from Bengal or Bombay but so far as I know no intraprovincial legislation has been provided. The geographical position of Burma, however, puts that Province in a different category and it would probably be advisable to have the Pest Act of 1914 revised with a view to giving the Local Government powers to exclude certain seeds or plants imported from India. The matter, however, is one which would require careful consideration by experts and up till now not much attention has been paid to it.

QUESTION 14.—IMPLEMENTS.—(*a*) (*b*) & (*c*) The Agricultural Department in Burma has made extensive trials of machinery and implements of European manufacture. So far no success has attended the direct introduction of any of these except on Government farms. Heavy machines such as tractors and threshers are much too expensive for the ordinary cultivator and difficult to move about owing to want of good roads. In the case of threshing machinery, the cultivator has the whole open season in front of him and with the exception of parts of Hanthawaddy district, where the open season is short owing to lack of roads he finds no difficulty in disposing of his crop with bullocks. A few people have tractors but only in localities where the conditions are peculiar. The tractor is of no use in the main rice tract of Lower Burma.

Implements for the use of cultivators must be—

(i) light enough for an ordinary pair of bullocks;

(ii) cheap enough to be within the means of the ordinary cultivator; and,

(iii) capable of being adjusted and repaired on the spot. The department has designed the following :—

(1) An improved plough share for fastening to the ordinary Burmese plough body. This is becoming popular and is likely to be in much demand.

(2) A screw water-lift with wind-mill for the irrigation of hot weather paddy, onions and other crops. This implement is a great improvement on the crude machine formerly used. It has been copied and is now being made in many localities by village carpenters.

(3) Seed-drill for sesamum, cotton and groundnuts. This has not found much favour as cultivators persist in broadcasting.

(4) An improved furnace for the making of jaggery. This is a decided improvement on the old and is rapidly becoming popular.

It is difficult to suggest means whereby the adoption of implements can be hastened. Manufacturers have done little in the way of becoming acquainted with local conditions. Agricultural Engineers have doubtless done what they could but their time has often been taken up too much with other work such as well boring or the erection of departmental buildings. I should like to see a whole-time expert employed and given sufficient leisure to concentrate on the designing of new tillage implements.

QUESTION 15.—VETERINARY.—(*a*) I think the Agricultural and Civil Veterinary Departments should be independent for the reason that they are manned by different services and there is apt to be strong resentment if a member of one expert service is put to work under a member of another. I, therefore, think that each department should have its own head.

(*b*) & (*c*) Little or no progress has been made in the opening of dispensaries in Burma and at present there are four only at Pegu, Prome, Pakôkku and Myingyan. The Inspector in charge of each is provided for from provincial funds. The Council, however, pays the rent of the building and the contingent charges for medicines. There does not seem to be much demand for these dispensaries in Burma.

(*d*) The Burma Village Act already gives powers to district officers to enable them to deal with the prevention and suppression of cattle disease. A good deal of the diseases in Burma, such as rinderpest, etc., are imported from Siam and the North-West Frontier. I consider that the veterinary staff on the Frontier should be strengthened.

(*e*) Yes. Delays frequently occur in obtaining serum from Muktesar. In one case a consignment went to Bangkôk, was then shipped back to Rangoon, delivered and used, although it must have been useless.

(*g*) I advocate the extension of provincial veterinary research institutions and provision of a special institute for the preparation of serum for Burma. Unless this measure turns out to be impossible from the point of view of finance or otherwise, I consider that it should be proceeded with at once.

QUESTION 16.—ANIMAL HUSBANDRY.—(*a*) (*i*) The local breed of cattle is an extremely hardy one and up till now was well suited to local conditions. With the opening up of better communications, however, especially in Lower Burma, a type of animal is required which will pull a heavier load. I proposed to the Burma Agricultural Committee that the problem of improving Burmese cattle should be attacked in two different ways and at two different stations. At one of these stations Burmese cows should be crossed with a bull of one of the heavier Indian breeds and then a herd built up from this cross which by selection might give the desired result. At the other station an attempt would be made to improve the breed by selection from within. Government has so far sanctioned the opening of one small station of about one hundred acres where it is hoped that a beginning will be made this year with an indigenous herd of about twenty cows and a bull. It may be noted that there is a great deal of promiscuous crossing of Indian and Burmese breeds. Indian cattle are kept for milk purposes by railway employees all along the line. I am of opinion that the import of cattle from India should be stopped or at least be placed under control and the Stock-breeding Committee which met in 1915 recommended this. The Committee's recommendation has not, however, been given effect to.

(*ii*) With the exception of a small *ghi*-making industry in the Sagaing district, which was probably originated by Indians at the Court of Ava but which is now entirely run by Burmans, there is no dairying industry in Burmese hands at present. Milk drinking is also not common among the Burmese and other Mongolian people, but there are signs that it is on the increase at least among the educated classes. Condensed milk is largely used among all classes especially as a food for young children, the imports of this commodity into Rangoon for the year 1925-26 being of a value of forty-one lakhs of rupees. There is, therefore, no immediate prospect of a dairying industry of any dimensions being started among the Burmese themselves. The local breed has never been selected for milk, with the result that the yield is very small although high in butter fat.

The milk supply of the large towns is mainly in the hands of Indians who graze large herds of cows in the neighbouring jungles and on the stubbles of the cultivated fields. These herds are usually either of Indian cattle or of crosses between the Indian and Burmese. The milk industry is conducted on most insanitary lines and that of Rangoon in particular is a public scandal. Some attempts have been made to improve it. A co-operative dairy was formed recently, but unfortunately the promoters knew little or nothing about the milk trade and did not apply for advice until too late. A scheme by a European gentleman had to be turned down for want of Government support in the matter of getting land. The whole question of municipal milk-supply in Burma wants a thorough investigation with a view to its reform.

(*b*) Grazing ground areas in Lower Burma are usually either swamps growing the roughest kind of grass or high land covered with trees or bushes. Generally speaking these are overstocked, although in many cases areas which are reserved for grazing grounds are scarcely used, being unsuitable for the purpose. The overstocking of pastures in Burma is very often aggravated, especially near the larger towns, by Indians who keep large herds of cattle and in the dry zone of sheep and goats. These people may or may not have a fixed abode. In any case they pay no land revenue and are purely parasitic. Government has considered this problem from time to time but has never properly tackled it.

Insufficiency of fodder is common in both Lower and Upper Burma. In the Lower Province, a good deal of paddy straw is wasted by burning and as a result there is a period of scarcity towards the end of the hot weather and again in August and September before the grass on the *bunds* is fit for cutting. In Upper Burma, want of fodder is sometimes acute in bad years. It is felt more there because this is one of the principal breeding areas. At such times cattle are driven for long distances to the banks of rivers in the search for grass, and free use is also made of the leaves of various trees and wild shrubs.

(*d*) In Lower Burma, the more careful conservation of paddy straw is a remedy and I think that decided improvement in this respect is taking place. In Upper Burma, it is very difficult to suggest any remedy. There is no fodder crop which can beat *juar*, but only the working bullocks get this. In the case of cows and young animals the only remedy would be a limitation of their numbers, but perhaps it is too much to hope for this. The nomadic evil has already been mentioned.

QUESTION 17.—AGRICULTURAL INDUSTRIES.—(*a*) It is not possible to do more than make a general statement. In the Upper Burma districts except in the irrigated tracts where rice is grown, cultivators find work to do during most of the year. In the Lower Burma rice area, work begins early in June and continues till the paddy is transplanted in mid-September. From mid-September to mid-December there is little doing except the work of regulating the water in the fields. Harvesting is from mid-December till the end of January. In February carting of paddy is in full swing. In March and April and most of May there is a slack season which is devoted to religious festivals. This is the principal period for outbreaks of crime.

In the slack season cultivators sometimes find work in carting, cutch boiling, cutting fuel and in thatching and mat-making.

(*c*) Bee-keeping, poultry-rearing and sericulture are looked askance on by strict Buddhists, or at least so they say. Fruit-growing is hampered by theft and the lowness of price due to glutted markets. Lac culture has been proved to be unprofitable on the plains. Most cultivators make their own ropes and many make their own baskets. A real impediment to enterprise in these directions is the restriction of freedom imposed by the communal life of the villages and by the failure of the people to live on their own land.

(*d*) A good deal of private enterprise has already been shown in establishing small industries in connection with oil-pressing, jaggery making, cotton-ginning and rice-hulling. I do not think that Government could do any more in this respect. In Burma, we have only a very small wheat area and the straw is used for cattle food. Cotton seed is all used for oil extraction or for sowing purposes. Nobody seems yet to have tried paper manufacture from rice straw, which latter has another possibility in industrial alcohol.

(*e*) The general drift of industry in Burma in connection with rice-milling, cotton-ginning and oil-seed pressing is towards the erection of small factories in the rural areas. None of our big towns are important manufacturing centres and the industries which support them are concerned with the handling and transport of goods rather than with manufacture.

(*f*) This was part of the programme of the Agricultural Engineer, but he has not as yet had time to take it up to any extent. I think such a study would be useful. A good deal of the machinery used in the smaller concerns is evidently not very efficient. It is, however, rather difficult to say what the next step should be after an industry has been found inefficient, as that would depend on the will and capital of the owner. A good deal of the inefficiency in rice mills and other concerns run by Burmans is not only due to mechanical defects but to other causes as well, *e.g.*, unskilled management, ignorance of accounts, slackness of discipline and too many holidays. It is often difficult to make an owner believe that if his season is only five months he should have a night shift as well as a day shift if he is to make his business pay.

QUESTION 23.—GENERAL EDUCATION.—(*a*) Although Burma has a higher standard of literacy than that of any other Province in India, the educational outfit of the average cultivator is very low. This has been obtained in the monastery schools where the village boys receive a smattering of reading and writing. They learn little or no arithmetic and know practically nothing about geography. The result is that the outside world is to them a blank and it is quite common to be asked such questions as whether England is farther away than India. The improvement of elementary school education must be the fundamental problem in all attempts to raise the status of the rural population. Theoretically, there would seem to be an excellent basis for the organisation of an efficient system in the monastery schools; hitherto, however, these appear to have resisted all attempts at reform and the Education Department, has, I believe, more or less given them up in despair.

(*b*) I can only suggest something after the type of the farm schools mentioned above. These might be extended to the villages as continuation schools probably of a peripatetic nature such as have been established in Belgium and other European countries. One thing is certain, *viz.*, that the course must be short and practical. If it is long enough to equip a boy for any other job than agriculture, he will not return to the land.

QUESTION 24.—ATTRACTING CAPITAL.—(*a*) The phrase "to take to agriculture" is ambiguous. It may mean in the first place that men of capital and enterprise would buy up large areas and let them out to tenants or secondly purchase large sized farms and work them themselves. If the first be the meaning it may be said that in Burma, especially in the rice tracts of Lower Burma, there is no difficulty in purchasing land. Land, in fact, is the most popular form of investment and is bought and sold as easily and as frequently as stocks and shares. In this locality there is some tendency to the formation of large estates, almost invariably resulting in absentee landlordship and hardly ever in agricultural progress. The reasons for this are given in answer to (*b*) of this question. If we mean, however, by "take to agriculture" that educated men of capital and enterprise should take up areas of land comparable to large and well managed farms in European countries, we are then faced with the difficulty that in each of such cases a certain number of existing small holders would be dispossessed. The Commission has been supplied with figures which go to show that the average holding in Burma is somewhere under ten acres and no man who possessed capital and enterprise could be expected to apply them to such a small area. He would, therefore, have to buy up other people's holdings, his purchase would involve dispossession and, if the process were repeated on a considerable scale, the formation of a large landless class. This is what happened in England when the enclosures began. As a distinguished writer on Agricultural History has said "The agricultural problem of holding the balance even between the economic gain and social loss of agricultural progress has puzzled the wisest of legislators". Under present circumstances, therefore, it would appear that in this Province a system that would allow for enlightened and beneficent landlordism is the one most likely to combine both economic and social progress. We have, however, to produce the enlightened and beneficent landlord and this is the crux of the whole matter.

(*b*) In this Province the first steps required to be taken towards agricultural improvement are provision for the following:—

(1) Cheap capital.
(2) A pure seed supply adapted to market requirements.
(3) Improvements in tillage.
(4) Improvements in the breeding of plough cattle.
(5) Improvements in the health and physique of labourers and tenants.
(6) Better marketing conditions.
(7) Intelligence and the conscious idea of progress in landlords and tenants.

It is clear that, unless a landowner has the means to employ agencies which can help him along the directions indicated in (1) to (6), it will be impossible for him, however good his intentions are, to do anything to improve his land or his tenants. The Agricultural, Co-operative, Public Health and Veterinary Departments are now at work to help in these directions and Government is also preparing a scheme for land mortgage banks. It is hoped that these agencies will remove the difficulties formerly existing against advance along the first six lines above. The impediments arising under (7) are of a more deep-seated nature and may be referred to under the heads of apathy, thriftlessness and want of foresight. In Burma, as in most Eastern countries, the idea of progress is not so conscious and persistent as it is in the West and the tendency in Burma is to place less value than Western people do on merley "Material" benefits, as they are called. There is accordingly more of what Europeans would designate as extravagance or uneconomic expenditure in connection with religious usages and social customs and thrift has not the same place of honour among the virtues as it has in Europe. I believe that this is a passing phase which will yield to education and the forces of general progress. Under this head may be mentioned the absence of useful handbooks on Agriculture such as undoubtedly played an important part in European advance. As agricultural education extends, an improvement in this matter should be expected.

QUESTION 25.—WELFARE OF RURAL POPULATION.—(*b*) No. Settlement Officers usually publish very full reports. To conduct special economic surveys would require special staff and the result would very likely reveal nothing very new.

APPENDIX

Note on the relations between the Central and Provincial Departments of Agriculture by the Director of Agriculture, Burma.

Since writing the answer to Question 4 (*a*) of the Questionnaire, I have had the opportunity of reading some of the published evidence given before this Commission by officers of both the central and provincial departments of agriculture. It is clear that the trend of evidence is to the effect that the central department, in order to fulfil its functions in the future and to enable it to meet the changed circumstances since the introduction of the Reforms, must be reorganised. The evidence of Dr. Clouston seems to point to the fact that in some of the Provinces at least the advice of Pusa is no longer required. This, however, must inevitably be the case so long as Pusa attempts to tackle problems for the solution of which the Provinces themselves have now provided an adequate staff.

In my answer to the Questionnaire I laid some emphasis on the necessity for maintaining a strong central department. I may here recapitulate the reasons which led me to do so. They are as follows:—

(1) In a federal system the Central Government must of necessity have the highest prestige and it follows that so must its various subordinate departments.

(2) There are, more particularly in India proper, large homogeneous areas which present problems of an all-India character which can be dealt with most efficiently and economically by a central agency.

(3) Specialists in particular matters can best be trained at a central station.

(4) A reserve of officers can be maintained for filling provincial vacancies. It is nowadays practically impossible to get an officer transferred from one Province to another.

Speaking for Burma there is not, I think, the same necessity for co-operation with the Central Government as there is in some of the other Provinces of India. By far the most important of our problems are those connected with rice and these problems are scarcely, if at all, related to the rice problems of Indian Provinces. Burma is the only Province which exports rice on a large scale and its problems, therefore, are those of millers in addition to those of cultivators. They are best dealt with by the provincial department. On the other hand, we have other problems in the solution of which the help of the central department would be of some advantage. In this category are included problems dealing with insect attack, fungus attack, animal nutrition, the improvement of tobacco, of oil-seeds and of cotton. It is also, I think, desirable on more general grounds that Burma should fall into line with other Provinces. Attendance at the Board of Agriculture and co-operation with the central department's officers and thereby with the officers of other provincial departments are bound to quicken the intelligence of the local staff, to enlarge its outlook and to promote a wider *esprit de corps* than would be possible among the workers in a single Province. I have endeavoured accordingly to sketch out what I consider the central department should be and what the relations of the provincial departments to it should be and I place my views before the Commission for what they are worth.

In the first place, I think the Board of Agriculture should be maintained in its old or in a slightly altered form as a purely advisory body. It never was a Board with any powers but was merely an annual convention or general assembly of officials and other persons interested in agricultural development in India. I consider that such a body is of very great use in sweeping together into one net the opinions of a great many different people on agricultural matters and in affording an occasion for the proper discussion of these matters. The Board too, as formerly constituted, gave an opportunity to the younger members of the department to meet their colleagues of other Provinces and discuss with them the problems engaging their attention at the moment. Such opportunity for the interchange of ideas I believe to be of the very greatest educational importance. I would, therefore, have a Board of Agriculture meeting, as before, every two years and submitting its findings for the acceptance of Government.

To correlate the work of the central and provincial departments it is necessary to have a body with real powers on which both are represented. Dr. Clouston makes proposals which appear to involve a Board of Agriculture, an Advisory Council and an Executive Committee. It appears to me that in addition to the Board only one body is necessary, which might be called the " Central Agricultural Research Committee. " It would of necessity be a much smaller body than the Board. It should have a representative of each of the sections or bureaus of the central department, a representative also of each of the provincial departments and probably a representative from each of the major Chambers of Commerce. To it would be sent projects which had been approved by the Government of India and its duty would be to make definite arrangements for carrying out the project in each case and for the provision and apportioning of funds. It is, I think, very desirable that this body should have at its disposal a special fund for the financing of research. I favour a fund to be raised by an acre cess rather than by a cess on exports. An acre cess would enable provision to be made for research in the case of crops which are not exported, *e.g.*, rice, in the case of which, if an export cess were decided on, Burma would have to pay for the rest of India and such a proposal would be unpopular as Burma already pays about a crore of rupees by way of rice cess. In order to promote uniformity the funds now at the disposal of the Indian Central Cotton Committee should be taken over by the proposed new Central Agricultural Research Committee and the cotton work would fall into line with the other projects of the Central Government.

The Committee proposed above would have administrative functions mainly. An executive agency is already partly to hand in the existing Pusa Institute and its staff, in the Central Cotton Committee, the Dairying and Animal Nutrition Institute at Bangalore and the Sugarcane Station at Coimbatore.

Dr. Clouston's evidence seems to indicate an intention to maintain the existing arrangements at Pusa and to go on extending the central department by the addition of various committees on the lines of the Indian Central Cotton Committee, working more or less independently of Pusa and its staff. It is desirable, however, that the experts at Pusa should have organic connection with all the activities of the department. Obviously the difficulties in which Pusa finds itself at the present time are the result of the absence of such an organic connection, which means that the experts there are more or less working *in vacua*. They have too little connection with the officers of the provincial departments and too little also with the other activities of the central department. The following organisation is, therefore, proposed to include all the central department's activities:—

(1) An Agricultural Adviser who should, if possible, be a Secretary to Government. He should not, as at present, have charge of the Pusa Institute but his duties should be to take general administrative control, coordinate the department's schemes and support them before Government.

(2) A Director-General of Central Research who would have under him an organisation consisting of the following bureaus, sections or offices, whichever name may appear best:—

(*i*) Soils and Chemistry.
(*ii*) Entomology.
(*iii*) Mycology and Bacteriology.
(*iv*) Engineering.
(*v*) Economics and Statistics.
(*vi*) Animal Husbandry and Dairying.
(*vii*) Crop improvement, with sub-sections, if necessary, for cotton, tobacco, wheat, sugarcane, rice, oil-seeds and horticulture.

Each bureau or section should have a Director working under the Director-General. The responsibilities of these would vary and their emoluments would, of course, vary as well, *e.g.*; the Bureau of Crop Improvement would obviously be by far the heaviest of the posts and would require to be directed by a plant-breeder of long experience and established reputation.

When a project proposed by the Board of Agriculture or otherwise had received the approval of Government, it would be sent to the Central Agricultural Research Committee which should meet at least once a year and the Committee would then proceed to allot funds and apportion the work between the various bureaus. In the case of various crops of all-India importance, *e.g.*, tobacco, it may be necessary for the Committee to open new stations in some of the Provinces. These stations should be entirely under the control of the Central Government. Responsibility should not be divided between the Central Government and the provincial departments and for this reason I do not favour the giving of grants to provincial departments by the Central Government. In other words, the machinery proposed is entirely the Central Government's machinery and any work to be carried out would be Central Government's work from start to finish.

Oral Evidence.

60903. *The Chairman:* Mr. McKerral, you are Director of Agriculture in Burma?—Yes.

60904. Will you tell the Commission shortly what your own past experience and appointments may have been?—I first of all graduated at the University of Glasgow, taking the M.A. degree there with Honours in mathematics and natural philosophy. After that, hearing that the Indian Agricultural Service was being started, and being rather attracted by the work of that service, I went to Edinburgh where I took the B.Sc. in Agriculture. In addition to the B.Sc., I took separate courses in mycology and bacteriology. In 1907, I was appointed to the Burma Agricultural Service. From 1907 to 1910, I was Deputy Director of Agriculture in Burma. After 1910, I was transferred to Pusa as Assistant to the then Inspector-General of Agriculture. After leave in 1911, I returned to Burma and

was Deputy Director, Southern Circle, till 1920. From 1920 to 1923, I was Deputy Director, Northern Circle. In 1923, I took up my present appointment.

60905. The organisation and disposition of the agricultural staff in Burma is set out for us in the provincial memorandum which has been in our hands now for some months, but as it is not proposed, following our usual practice, to publish that memorandum, I think it might be well if you would give us at this stage again, quite shortly an outline of the personnel and its distribution through the Province?—Perhaps I had better begin by describing the sanctioned appointments in the various cadres; I have got them here. In the Indian Agricultural Service we have a sanctioned cadre of sixteen of which twelve have been recruited up to date; but of these sixteen originally sanctioned two were meant for the Shan States, which are now separate from Burma. We have a Burma Agricultural Provincial Service on a pay of Rs. 300 increasing by Rs. 20 to Rs. 800; the sanctioned cadre is nineteen. Fifteen have been appointed up to date, of whom four are temporary. Then we have a Subordinate Service on a scale of Rs. 150 to Rs. 300, the sanctioned cadre being 102. We previously had a junior grade of this Subordinate Service, but recruitment to that has now been stopped, the number of men still remaining in the junior grade counting against the vacancies in this Subordinate Service. Then we have a grade of fieldmen on a pay of Rs. 30 increasing by Rs. 2 to Rs. 60; the sanctioned number of appointments is fifty-two and we have recruited thirty-two up to date. In addition to these regular services, we have a Sericultural Section, a small section of four senior assistants and four fieldmen, and we have an Agricultural Engineering Section. These services are distributed between the Agricultural and Research College, Mandalay, and the field work. The Agricultural College in Mandalay has the following superior staff: one Professor of Agriculture and Principal of the College, one Agricultural Chemist, one Economic Botanist, one Mycologist and, in addition, the Engineer who is outside the cadre of the ordinary service. For field work the Province has been divided up into nine circles. Subsequent to the Retrenchment Committee's report, we amalgamated two of these circles into one, so that we have now eight circles, each in charge of a Deputy Director. Each circle is to be provided with a central farm; the staff of the central farm consists of two senior Agricultural Assistants and three fieldmen. In addition to that, two senior Agricultural Assistants are also allowed for demonstration work in each district of the Province.

60906. What is the prime purpose of these district farms?—They are meant for experimental purposes.

60907. And not for demonstration?—Not for demonstration.

60908. Have you any peripatetic organisation apart from that which you have described?—We have two senior Agricultural Assistants for each district.

60909. And do they travel about?—Yes, they travel about.

60910. How about the quality of your demonstrators?—Most of the men whom we have appointed for that work up to date have been graduates of the Poona Agricultural College. Our own Agricultural College was only opened in 1924, and prior to that we had to avail ourselves of the Agricultural College in Poona.

60911. Are your demonstrators equipped at all on the practical and commercial side? If a cultivator asks them for advice about marketing, for instance, or about farm management, are they capable of answering intelligently?—I think so.

60912. Do you regard that as important?—Yes.

60913. A man may be extremely good technically, but if he cannot talk to the cultivator in a fashion to impress the cultivator with his own general knowledge of farming, the cultivator is not likely to listen to his advice about a particular crop; would you agree with that?—Quite so.

60914. Is it your opinion that a fair share of your attention and of your budget expenditure has been devoted to demonstration as compared with research?—I think there has been fairly even distribution between the two.

60915. Do you think, to use a modernism, that you are getting the goods over the counter? Is that which you have available being put at the disposal of the cultivator?—I think so.

60916. Have you had any success with shows?—Do you mean cattle shows?

60917. Yes, cattle shows or produce shows?—Yes, we have a number of cattle shows and produce shows every year in various districts.

60918. As regards agricultural teaching, your new college at Mandalay is hardly under way yet?—The new college was only opened in 1924. So that we have only had three years' experience of that work and we have encountered a certain amount of difficulty.

60919. Are you satisfied with the calibre of the teaching there?—Yes.

60920. I think you mentioned at one point in your note that, in your view, the teaching is apt to conflict with the interests of research?—And I most decidedly think so.

60921. Do you not think, provided the research worker is not asked to teach too much or to teach subjects too elementary, that in all experience in this country and in other countries teaching and research have a very beneficial action each upon the other?—That is so I believe, but our difficulty here is that the teaching is too elementary; it takes up a good deal of time in what must be drudgery to a man who is doing research.

60922. But when full development at your college takes place, would you not yourself like to see your research workers occasionally lecturing to your students?—I think it would be advisable if they kept in touch by lecturing to, say, the advanced students.

60923. You have, in Burma, three very distinct areas which are described with clearness in the memorandum. Is it your opinion that the Agricultural Department, both in research and in demonstration, has given a fair amount of attention to the problems of each of these areas?—It has given sufficient attention to the Lower Burma wet area and to the dry area of the mid-zone, but we have not yet done very much with the northern area.

60924. It is natural to take the nearest problem first?—Yes.

60925. That is what has happened I suppose?—Yes.

60926. But are you satisfied you have done what ought to be done with the dry tract?—Yes; we might have done more, of course, but I think we have done all we could with the staff and resources at our disposal.

60927. Would you say the dry tract offers more scope for improved methods and better crops than does the wet tract?—It offers more scope in the sense that it has got more crops; it has got multiple cropping, whereas the lower wet tract is a one-crop tract.

60928. In your answer to Question 1 (*a*) (*i*) you say: "Most of the plant-breeding work falls on the Deputy Directors as the subject is too wide to be dealt with by one Economic Botanist at the College. On the whole, I consider the present system satisfactory except that the training in plant-breeding given at the various agricultural institutions in Europe is not sufficient to enable Deputy Directors to begin straightaway on their arrival." Would you enlarge upon that a little and tell us in what particular direction these men have been found to fail?—I do not say they have been found to fail exactly.

60929. Then to fall short of your standard?—They fall a little short of the knowledge that they might have when they arrive. I mean the men who have taken the ordinary agricultural course do not, I think, get the amount of teaching in genetics and plant-breeding which they might get.

60930. Do you mean they are deficient in the knowledge of how to go about the work?—They have had no practical experience of it before they come out.

60931. *Sir Thomas Middleton:* I think your point is that the ordinary under-graduate course at a British institution does not include any considerable course in plant-breeding and genetics?—That is the point, yes.

60932. The method of giving instruction in plant-breeding is to select students after graduation and to put them through special courses; that is what is done in Britain?—Yes.

60933. You have been getting, your Deputy Directors directly after graduation?—Yes.

60934. They have had no post-graduate instruction at Home?—Not usually.

60935. And that is the reason why they come out without the knowledge in the technique of plant-breeding that you would desire?—Yes.

60936. *The Chairman:* You give us, in answer to Question 1 (*a*) (*ii*), the position as regards veterinary research. You are definitely of opinion that the laboratory provision is adequate to the immediate needs of the Province. Is it the case that the two officers that you mention in your answer as being about to be recruited have now been recruited?—One has been recruited, I believe, and is on his way out; one has not yet been recruited.

60937. In answer to Question 1 (*c*), which ran: "Can you suggest any particular subject for research not at present being investigated to which attention might usefully be turned?", you make some interesting suggestions. Have you any indications that there might be an opening for the export of frozen soft fruit from Burma?—We have certain fruits in Burma which I do not think are known at all in the European market, the mangosteen, for example, and one or two others. I think it might be worth while making an attempt to get these marketed.

60938. I remember twenty years ago a fruit called the durian?—Yes. I do not think that would be a very favourite fruit in London though many in Burma quite enjoy it.

60939. Has your department paid any attention to any particular form of container or package used for the export of any fruit or vegetable produce?—No.

60940. Is that a possibility that might be examined, do you think?—It might be, yes.

60941. You have a great variety of forest timbers here, have you not?—Yes, a tremendous variety.

60942. You mention the possibility of successful attack on the insects that do so much damage to certain classes of produce during transport by sea. Do you know whether any representations have been made to any organisation in Great Britain which might be prepared to give a grant or to undertake that work?—I cannot say, but my attention was drawn to an attempt which was made some years ago to export a particular bean which grows in Burma, to Australia I think it was, but it was found to be impossible because of the amount of damage done by insects on shipboard.

60943. Are you familiar with the activities of the Marketing Board?—I have read some of the publications.

60944. Do you know that this particular subject is one which that Board might be willing to take up and, in part, to finance?—I do not know.

60945. I think you will find that is so; it might be a very important contribution to the export trade of Burma in the particular lines of produce affected?—Yes, it would.

60946. In answer to our Question 2 (*i*), on agricultural education, you say: "Instruction to adult cultivators is given at most of the central farms of the department." That is a practical short course, is it?—Yes.

60947. Are they grouped as a course or treated as individual learners?—They come in batches and they are treated together when they come; we have had this for many years now.

60948. Is it successful?—We have had a certain amount of success from it, but I should not say it has been a great success; it has been too haphazard to be successful; that is why I am trying to improve it by having a definite course.

60949. You are moving in the direction of systematising that method by the creation of farm schools with a graduate in charge of each?—Yes.

60950. Have you any indication as to whether these graduates are going to prove equal to the occasion?—We have only just begun. We have two

of these farm schools this year as an experimental measure. One I am familiar with, the other I have not yet inspected. The other is the Hmawbi Farm which has nine or ten pupils and I think it is doing quite well. You will be able to see it on Sunday when you go there.

60951. Is it free to cultivators?—It is more than free. The cultivators who attend get stipends.

60952. *Professor Gangulee:* How many such schools have you?—Two.

60953. Is the attendance satisfactory?—It is only being tried as an experimental measure. I cannot say as yet.

60954. *The Chairman:* Meantime I judge from your answer to Question 2 (*v*), on page 3, that your department is tending to grow and thereby more posts are being created. Is it the case that in the immediate future the output of the Mandalay College will find sufficient appointments waiting for it?—The time will come shortly when the College will only have to supply the wastage for the services.

60955. You have reached that point?—We will reach that in about four years time.

60956. In answer to Question 2 (*viii*), you raise the principle of nature study and school plots. Have you had any opportunity of observing closely the workings of these in the Provinces?—We used to do the inspection of these school plots at the request of the Education Department. The conclusion which I came to was that the work was not well done. We found that it was lacking in supervision. After that the Education Department took a man from our department and put him in charge of the whole of the work. I think there was some improvement then but a little later the whole scheme was turned down by the Finance Department.

60957. Conducting nature study is not as easy as it appears?—I should think not. It wants a lot of supervision.

60958. And genuine understanding on the part of the teachers?—Quite so.

60959. Do most of your teachers in rural primary schools belong to the agricultural class or do they belong to the town?—I am afraid I cannot say. The Director of Public Instruction may be able to answer that.

60960. Do you provide any instruction in account-keeping or in the business side of farming at these short courses, or are they purely technical?—We hope to have. During the present year we are simply experimenting with the curriculum. We do not know what we can teach.

60961. Are you going to teach marketing as a subject?—I have not thought about that.

60962. I see, like many others, you come to the conclusion that demonstration on the cultivators' own holdings is the most successful way of tackling the question?—Yes.

60963. Have you any demand from cultivators for teaching in elementary mechanics, care of machinery and so on?—There is no great demand. We have a certain number of applications from people who want to start small factories, small mills, for help and advice.

60964. Is it the policy of the department, so far as the matter lies with it, to encourage that development?—Yes.

60965. Do you think that the extent to which rice milling, for instance, is carried on as a local industry has affected the purely rural standard of living and, where it exists, the rural wage?—Yes, I think so. It must certainly do so.

60966. To that extent do you regard it as a very valuable element in the situation?—Yes.

60967. You give us a list of the successes which the department is able to show. Where does the demand come from for potatoes from the Southern Shan States?—The demand is both internal and external. About half the crop is consumed internally and the other half is exported to Calcutta.

60968. Have you been renewing the seed?—We have been renewing the seed continually by importing potatoes from Scotland.

60969. What contribution have you been able, as a department, to make towards cotton-growing in the Province?—I am afraid our contribution has been rather small so far. We have an experimental farm at Mahlaing which, I think, you are visiting in about ten days' time, and another farm at Allanmyo which you are also visiting. Both these farms deal with cotton. We have selected varieties of cotton which we are distributing, but we have not been able to go far along those lines as we have had to encounter two or three bad seasons at the beginning of the distribution work. This has of course set back the work. Cotton is one of our most difficult crops.

60970. Do you think it offers good hope of making progressive changes?—Yes, the acreage is small compared with the acreages in India but a good deal of improvement can be made both by way of increasing the ginning percentage, the yield and by improving the staple.

60971. Is it not an important money crop for the people who are growing it?—It is one of the important money crops. They grow groundnut as well.

60972. How do you compare the purchasing power of villagers in the cotton area with that of the cultivator in the Lower Burma rice-growing tract?—It is rather difficult to make a comparison. I should say that the cultivator in the cotton area is in a much more precarious position than the cultivator in the Lower Burma or rice-growing tract. In a good year, for instance, two years ago, I think with the prices got for cotton cultivators of cotton were probably better off than cultivators of rice in Lower Burma.

60973. The Middle Burma tract does not suffer from shortage of moisture, does it?—It does; the shortage of moisture is a limiting factor there.

60974. Has any attempt been made, by the introduction of green manuring or any other practice or method of tillage, to meet that difficulty?—Yes, we have tried demonstrating line-sowing and inter-cultivation of cotton. We found on the experimental farms that in a good year the yield of cotton could be nearly doubled by that method, but there are difficulties in the way of introducing it. One difficulty is labour, and another is that the cultivator must sow after the first shower of rain. If he misses that shower, he probably misses the crop, so that he is reluctant to take to that method.

60975. Does the land get very hard in the dry season?—No; it is sandy soil.

60976. So that ploughing is possible in any season?—Yes; as a matter of fact we have demonstrated it. The land is ploughed up after cotton so as to absorb the first shower of rain the next year.

60977. Will you tell us about the condition of the draught cattle in the dry tract?—The dry tract is one of the principal stock-breeding areas in the Province. The Burmese breed of cattle is a very hardy and nimble breed. The milch cows, however, are simply let loose and scarcely any attention is given to them. The young cattle look after themselves, so that the Burmese bullock by the time he comes to the plough is really a survival of the fittest.

60978. What is the season of the fodder shortage in the dry middle tract?—In the dry middle tract the principal fodder crop is *juar* (millet). This is given only to the working bullocks. In addition to *juar* stalks a little oil-cake is also given. Milking cows and young cattle get nothing but grass.

60979. Is there a definite fodder shortage at any particular season of the year?—Yes, sometimes. In Lower Burma, there is often a shortage of fodder just before the rains. The fodder there is paddy straw. If the cultivator does not take the trouble to lay in a sufficient stock of paddy, there is sometimes a shortage, but there is no reason why there should be a shortage. Sufficient paddy straw is grown to feed the cattle in Lower Burma. Then again there is a shortage sometimes towards the middle of the rains, before the grass on the *bunds* of the paddy fields is high enough to be cut. Of course in Upper Burma in the dry zone, very often there is extreme shortage.

60980. I do not quite gather what is the season of shortage in the middle dry tract? Is it in the spring?—Yes; I should say in the hot weather just before the rains.

60981. How about the tractive power of the bullock? Is it insufficient for the work?—It has been sufficient for the work up to date. I think probably we want a heavier bodied animal now, and some of the cultivators seem to realise that.

60982. Would the tractive power of the bullock be the limiting factor as regards the introduction of improved ploughs?—Undoubtedly. At the same time the bullock is strong enough to pull the plough that we are demonstrating now.

60983. In answer to Question 4 (a), you make some observations about the organisation of research generally and you have cited the case of the United States of America. You point to the need for certain work being carried on and certain functions being discharged by the Central Government, and you make your scheme quite clear. Do you think the Provinces would, as a whole, welcome the setting up of research stations financed and conducted by the Government within their boundaries?—I do not know, but I do not see why there should be any objection so long as they have not got to pay for them.

60984. I understand from your note that you are suggesting that such central research stations should be manned entirely by the servants of the Central Government?—Yes.

60985. Are you contemplating any inter-connection between central stations sited in the Provinces and the provincial agricultural research stations in the Provinces?—The research conducted by the central research officers in the Province would be to the advantage of the Province, but I think it ought to be conducted by the central department.

60986. If your plan were developed it would mean a very important addition to the personnel employed by the Government of India, would it not?—Yes.

60987. Assuming that such a scheme were to be adopted, would you expect to find men available in the world market at this stage?—I think the supply grows to meet the demand, and if it became known that men were wanted they would turn up.

60988. You would not find them to-morrow, but you do think that in five or six years' time men would be found to meet the demand?—Yes.

60989. You have, of course, in mind the fact that other research departments in other parts of the Empire and, indeed, outside its boundaries are being developed very rapidly at this moment?—That is so.

60990. Would you like to say anything about the virtues or the reverse of the five-year contract as a means of attracting the highest type of research worker?—I am not in favour of short-term appointments. I think it is much better to have a service. If a man were engaged only for a short term, that is for five years, he would tend to think too much about what he was going to do after that five years when his term is up.

60991. Would you be surprised to learn that Professor Biffen told us that it takes him nine years from the moment when he starts on a particular plant-breeding experiment before he recommends his new variety to the farming community?—That, of course, is the real objection to the short-term appointment.

60992. Are you at all familiar with what is taking place in Australia in this matter of the development of central activity?—No; I only saw a notice in the papers the other day. I have no personal acquaintance with Australia.

60993. I happen to know that country well, and the position was that the States were extremely jealous of each other before the federation in 1900, and equally so thereafter for a number of years, but that jealousy, gradually grew less and lately the tendency has been to realise that there are certain things the Federal Government can do which no State can do for itself and the development is in that direction, without any infringing of the prerogative or fields of self-government of the States. What relation

do you think your central research council which you suggest should bear to Pusa as a central research station? Should it be an advisory or a controlling body so far as central stations go?—Mainly advisory I should say. Pusa would be controlled by the Director.

60994. When you come down to the day-to-day administration you are prepared to depend upon your Director whose authority would not be impaired by your scheme?—Yes.

60995. I do not know whether there is anything that you would care to add at this stage to your very interesting suggestions in this particular direction?—I cannot think of anything.

60996. What view do you form of the prestige that Pusa enjoys in the Provinces generally at this moment as compared with that which it held, say, fifteen years ago?—I think its prestige has fallen greatly.

60997. How do you account for that?—Because it has not got the opportunities which it used to have. The growth of the departments in the Provinces has more or less taken the feet from under Pusa; it has been isolated; I understand also that the staff has been greatly reduced and the men who are there are not working under the same advantageous conditions as obtained, say, ten or fifteen years ago.

60998. *Professor Gangulee:* What about the quality?—I have heard the opinion expressed that the quality of some of the recent work is not up to the previous standard; but that, of course, is only one man's opinion and how much stress can be put on that I do not know. We certainly saw very valuable work being done at Pusa some twenty years ago.

60999. *The Chairman:* You give us an important note in answer to Question 4 (*c*) (*i*) and (*ii*). You say that both the agricultural and Veterinary Services in Burma are at the present moment understaffed and that considerable difficulty has been experienced in getting the right type of recruit. Has any policy been adopted by Government in regard to this matter?—Not at present, but the matter is being considered.

61000. Is it your view that if you want to get the right type of man you must pay him enough to attract him?—I think so.

61001. You are inclined to favour an acreage cess as a means of financing the progress of agriculture, rather than an export cess; is that so?—Yes.

61002. Do you think there is any need for a special cess? Is it sound to finance agriculture by a special cess?—I do not know. I am afraid that it is a question of finance, and I would leave that alone.

61003. That is probably a sound view?—I only wanted to stress the fact that Burma already pays something over a crore of rupees in rice cess.

61004. Can you give us some idea of the extent of the planting interest or the size of the planting community in Burma?—The acreage under rubber, which is our only important planting crop, is about 70,000 to 80,000 acres. I think I have given in the memorandum the total value of the exports of rubber. It is about a crore of rupees annually.

61005. Do you think the planting community is getting a fair share of your attention?—They have not had very much up to now.

61006. Have they asked for it?—No; I do not think so; I think they are more inclined to develop their own organisation.

61007. Where such organisations have been developed and are doing good work, are you as a department in touch with their work?—They have no organisation at present.

61008. It is only an intention to organise themselves for research; they have not achieved it?—Yes.

61009. When they do organise, do you think it is important to keep in touch with the research carried on by that organisation?—Yes. The situation at present is that the Mycologist gives advice about diseases in rubber; that is about all we do.

61010. Turning to another question, has it been considered at all whether it would be wise to develop the department in the Tenasserim Province, in view of the important possibilities of development?—I do not understand.

61011. Have you any experimental farm and so on in the Tenasserim area?—Yes; we have just opened one.

61012. Are the problems in that tract different from the problems with which you are familiar in Upper Burma?—In Tenasserim we have planting problems; the possibility is mainly on the planting side.

61013. Tea and coffee?—Yes, and coconut.

61014. Is your departemnt in touch with the quinine-growing that is taking place in that Province?—No, that is done by the Government of India.

61015. Have you large estates, properties of large area, farmed by Burman gentlemen? Does that state of things exist at all?—There are very large estates of paddy lands extending to thousands of acres.

61016. Is there any demand from any quarter for estate managers?—Not as yet.

61017. What provision are you now making for the formation of your new Superior Provincial Agricultural Service on the recommendations of Lord Lee's Commission?—There is no official announcement about it yet. I have seen the papers; I do not know whether I can give it out.

61018. That is a problem which will be very soon pressing upon you; is it not?—Yes.

61019. Can you give post-graduate training of a satisfactory nature anywhere in the Province?—Not yet; the college at Mandalay is not sufficiently developed for that.

61020. How long will it take before the college at Mandalay can give satisfactory post-graduate courses?—I could not possibly say, I might guess possibly ten years.

61021. Ten years?—In ten years' time we shall have a good deal more experience.

61022. How about your practice in the matter of recording your experiments and the results that you achieve? Are you satisfied with that?—Yes, I am satisfied. When you go to Hmawbi and other farms, you will see the methods adopted. The results are published in the annual reports.

61023. Would you agree that it is just as important that the experiments which fail should be recorded as that successes should be registered?—Yes; quite so; they are recorded.

61024. Mistakes are bound to be made, but they may make as substantial a contribution towards progress as successes?—That is so.

61025. Has there been any attempt to assess the detail of the indebtedness of the rural population?—Almost every Settlement Officer, I think, makes enquiries into indebtedness during the course of the settlement.

61026. Are all the particulars of debts secured on mortgage available in the settlement reports?—I think so, but I am not quite sure; I do not profess sufficient knowledge of the subject to be able to give evidence of much value.

61027. You probably agree that, in relation to agricultural progress, for obvious reasons indebtedness is a most important factor?—It is a very important factor.

61028. Are you satisfied with the service given by the railways?—No: we have not sufficient railways in Burma. I think the service of existing railways is good enough, but we want more lines.

61029. What do you want; main lines or feeder lines?—Both main lines and feeder lines. One of our divisions, the Arakan Division, is completely isolated from the rest of Burma, except by sea; most of Tenasserim is practically the same.

61030. Do you think Burma has had a fair share of the Railway Board's attention?—It has not up to date, I am afraid.

61031. Is motor transport likely to make an important contribution towards the movement of agricultural produce?—I should think so; I think it is getting very popular as far as passenger traffic is concerned.

61032. But the great bulk of your movement in produce is by water?—And by rail.

61033. You told the Commission that you have not had occasion to study *the question of finance in relation to agriculture*; that was in relation to *the particular problem of indebtedness. But I take it* the same applies to *taccavi loans, the need for long-term money* and so on. Would you care to discuss them at this stage? Take, first, long-term loans?—I have read the draft Bill (the Land Mortgage Bill), but I am afraid I have not studied it very carefully; I think it is quite a good scheme, on paper at least.

61034. Apart from the need for long-term credit for financing old established debts, do you think there are many improvements which might be effected by cultivators or landlords if they got long-term loans?—Yes, I think so.

61035. In what direction?—The use of artificial manures for rice in Burma is becoming a matter of importance and it will be a matter of increasing importance as the years go on. There are many other matters, such as the matter of tanks in the dry zones, and small irrigation systems, which may be financed in that way.

61036. How about the digging of wells in the dry tracts?—There has been no systematic survey of artesian water. The existing wells are surface wells, sometimes very deep, seventy to eighty feet; there is a scanty supply. In the first place, I should like to see a certain number of artesian wells in dry zone lands. The country, of course, is not well suited to irrigation: it is a rolling country of hill and valley, and in that respect I do not think *it is suitable for irrigation* by tube well.

61037. Unsuitable for irrigating on the grand scale. But tube wells might be successfully sunk?—The objection is also in the cost.

61038. But until a survey, technical and economic, is made, it will be difficult to say whether they will be successful or not; such a survey has not been made?—Such a survey has not been made, but borings have been made sporadically by the Public Health Department.

61039. Have you any problems of fragmentation, so far as those problems arise from pressure on the land?—We have very little fragmentation in Burma.

61040. The pressure on the land is not likely to make it a problem?—Only in one of the Arakan districts is fragmentation a special problem.

61041. Are you of opinion that, from the agricultural point of view, much has to be done in the way of what is called river training, or river conservancy, or reclaiming land in the deltas?—There is a good deal to be done in training the streams which flow from hills and cause devastation by floods. That is a matter which the Public Works Department have in hand now. The Forest Department tackled it in one of our districts with very considerable success, and I think the situation is that a Forest Officer has been lent to the Public Works Department to carry out the work in another district.

61042. Has it ever occurred to you that more might be done to exploit the immense potential value of the silt which is swept by these great rivers down to the sea day by day? The question of increasing the fertility must be very important?—The amount swept down to the sea is enormous. In Burma, the Irrawaddy takes down about six times the discharge of the Nile.

61043. Most of that silt goes into the sea?—Yes, of course, if you like to wait long enough, you get new land where the sea now is.

61044. *Mr. Calvert:* Is it the discharge of the silt which is six times that of the Nile, or is it the discharge of the water?—It is the discharge of the water.

61045. *The Chairman:* Are you of opinion that more might be done to get the silt, where the lie of the land makes it possible, on to the land, in order that its manurial value may be made use of?—I should think it would be very difficult in the case of the Irrawaddy river. The Irrawaddy is an excavating river. I believe it does not overflow its banks or change its course like the Ganges, which is of the opposite type. I do not see how you could get the silt from the river on to the land.

61046. Where the river is passing close to excellent agricultural land, which is suffering from over-cropping, the depositing of the silt on the land would be of manurial value?—Yes.

61047. If it could be done, it would be an enormous contribution to the fertility of the Province?—I have heard the possibility discussed of *bunding* the Irrawaddy at the neck of the delta, to create a great irrigation system. I do not think anybody has ever tackled the problem seriously.

61048. In order to get the silt on to the land?—To get the silt out of the water for second cropping.

61049. Have you any water-logging or soil deterioration problems in Burma?—I think, not many.

61050. Do you know of any alkali land?—No, except small patches here and there. There are no large tracts of alkali land.

61051. In the matter of soil survey, you are beginning work, which, as time goes on, will develop into a soil survey for the whole Province?—Yes. The Agricultural Chemist will be able to explain to you what is being done in Mandalay.

61052. Do you find that the deltaic tract is uniform as regards its soils?—It is not uniform. There are considerable differences in soil fertility in the delta.

61053. Have you any districts in Burma in which serious denudation of agricultural land is taking place as a result of hill streams carrying away the soil?—What we have in Burma is mainly destruction by floods.

61054. I was referring to shifting cultivation. Have you much of that?—We have a tremendous lot of that in the Shan Hills.

61055. Is the erosion that is taking place serious?—I suppose it is. The Forest Department, I understand, now give out teak seeds to the cultivators of these areas to have them planted up when they lease out a new site.

61056. *Sir James MacKenna:* It takes a long time for the teak tree to grow up?—Yes, but it means that they do not come back to the same area again.

61057. *The Chairman:* In the matter of fertilisers, are there important deficiencies in the soils of Burma?—Most of the Lower Burma paddy soils are deficient. When I say deficient, I mean that they respond to manuring by nitrogenous manures.

61058. There is a deficiency in nitrogen?—Nitrogen and phosphates. I should say that nitrogen and phosphates are the limiting factors in Lower Burma rice soils.

61059. Has the problem been worked out for the dry tract?—No. There, the limiting factor is water.

61060. You give us, at more than one point in your note, a clear account of your method of seed distribution. I notice you say that in the case of rice, at any rate, the demand remains greater than the supply?—Yes, that is so.

61061. Have you worked hand in hand with the co-operative organisation for seed distribution?—We have done a good deal with co-operative societies.

61062. Have they helped you?—Yes.

61063. Do you see any signs of private enterprise coming forward?—Not much.

61064. Is there no private agency engaged in seed distribution?—There is nothing in that form, but we have a great many private individuals who take our seeds and grow them.

61065. Do they give out seed of a satisfactory quality?—Yes.

61066. Do they distribute your seed?—They grow our seed and distribute it to their neighbours.

61067. On a commercial basis?—They always do these things on a commercial basis.

61068. Do they do it on a commercial basis, or do you subsidise them?—We do not subsidise them,

61069. *Professor Gangulee:* The private seed growers do not get any financial assistance from the department?—No. They simply take our seeds. They get a reward by getting better prices for the better seed.

61070. *The Chairman:* In answer to Question 10 (*e*), you say "Increases of the yield up to forty per cent at least were got by the use of sulphate of ammonia combined with phospates". Was it an improved variety that you were feeding with these manures?—No.

61071. Do the experiments show conclusively that such applications do not pay?—Yes.

61072. Are you satisfied with the sufficiency of the experiments?—Yes. The probable error of the experiments was worked out. As a matter of fact, it was one of the first field experiments in India where the probable error was worked out experimentally.

61073. In answer to Question 13 (*i*) and (*ii*), you rather give me, at any rate, the impression that you are of opinion that it may be necessary to take steps to prevent the introduction of plant diseases from the Peninsula proper?—Yes, I think it will be desirable.

61074. Does not all history suggest that, if the thing ought to be done, it ought to be done as soon as possible, rather than wait until these diseases come?—Yes.

61075. Have you represented that to the Government?—The matter is being discussed just now between myself and the Financial Commissioner. It was discussed about two years ago, but it was turned down by the then Development Commissioner.

61076. In answer to Question 15 (*a*), on veterinary matters, you give us the existing position as between the Veterinary Department and the Agricultural Department. Can you give us any indication of the policy of Government in the matter?—I think the present policy of Government is to unite the two. It has not been declared yet, though.

61077. You are definitely of opinion that the policy of separation is the best one?—Yes. The two services are different. Of course, I think there would be some advantage in combining the two departments but I admit that it is difficult.

61078. Have you any particular officer responsible for livestock improvement?—We have no particular officer. One of our Deputy Directors is starting a livestock farm.

61079. He has specialised in the subject?—Yes.

61080. Would you regard the fixing of his responsibility and the attaching to his post of some title suggestive of his function to be a good beginning?—I may say that in the proposals which I made for the new service, I included the post of Deputy Director of Livestock Breeding.

61081. Which do you regard as the most important from the point of view of general agriculture, the improvement of milk yields or the improvement of the draught power of the cattle?—In Burma, improvement of the draught power. People in Burma do not drink fresh cows' milk; they use tinned milk.

61082. How about the buffalo? Is that an important animal in the way of milk yield?—In Burma the indigenous buffalo is a draught animal, but it is becoming more and more unpopular as the years go on; its numbers are decreasing.

61083. Why?—I do not know. He is being replaced by the bullock. He is an unwieldy sort of animal, very liable to disease and much more difficult to handle than the bullock.

61084. And an animal with a very definite idea of the value of his own leisure, particularly on a hot day; is that so?—That is so.

61085. Is that one of the principal difficulties, that they will not work in the sun?—Yes, they must have mud baths, wallows, to keep well.

61086. Is it worth discussing sheep and goats?—Except as agricultural pests, I have no desire to discuss them. I think the goat and the sheep are decided pests in this country.

61087. Why?—Because they eat up the fodder which is required by the cattle.

61088. *The Raja of Parlakimedi:* Do not they give manure?—No.

61089. *The Chairman:* Do goats play an important part in the domestic economy of the rural household? Do they supply milk?—No, they are mainly raised for killing in the larger bazaars.

61090. Do you think there ought to be some control over the importation of cattle from India proper into Burma?—That was proposed by the Stock-Breeding Committee which we had in 1916 I think; one of its proposals was to stop the importation of cattle from India to Burma; but, so far as I know, no action was taken on the report of the Committee. That was another case of procrastination.

61091. In the matter of fodder, has your department made any experiments in the way of the preservation of fodder against the season of shortage, by any particular method such as the silo? Have you experimented with that?—Yes, we have done some silo experiments in the dry zone; it is quite successful there.

61092. Pits or towers?—Pits.

61093. Has it taken on at all amongst cultivators?—No.

61094. Why not?—Cattle in the dry zone are fed on the dried stalks of *juar*. Our cattle are not milking cattle; they are bred for draught and the necessity for silage, I should think, is not so great as it is in parts of India where cattle are bred for milk.

61095. But there must be some relation between nourishment and draught power, surely?—Of course there is.

61096. Have you seen any desire to improve the quality of the breed or the value of the animal as a draught animal?—I know of one or two cases where a man has actually made experiments, mainly by crossing with Indian cattle; he wanted to get a bigger animal. But, generally speaking, the whole business is perfectly haphazard.

61097. *Professor Gangulee:* Are these pit silos dug in Upper Burma or Lower Burma?—In the dry tract.

61098. *The Chairman:* In its bearing upon the dairying industry, you mention that milk consumption is on the increase but that most of it is satisfied by the importation of condensed milk, principally as a food for young children; no less than forty-one lakhs of rupees were spent in 1925-26 on condensed milk?—That is so.

61099. Do you know at all whether the milk given to the babies is full cream milk or skimmed?—I think it is mainly the Nestle's brand, the sweetened "Milkmaid" brand.

61100. Is that skimmed or full cream?—I cannot tell you what it is; it is milk with sugar.

61101. You see the importance of the point, do you not, from the baby's angle?—Yes.

61102. And thereby, obliquely, from the dairy farmer's point of view?—Yes.

61103. Is any control over breeding exercised by these stock raisers?—None whatever, no control.

61104. No attempt to pick better bulls as the parents of progeny?—I should say no.

61105. Has any attempt been made at all to encourage the castration of unfit bulls?—No.

61106. It is a veterinary point but I should like to ask you: do you regard rinderpest as one of the most serious afflictions from which the cattle population in this country suffer?—It is certainly one of the most serious.

61107. The economic loss over any ten years is probably very important?—Yes; in some years we have over 100,000 deaths.

61108. Would you regard any steps which might be taken to mitigate that danger, if they were successful, as a very important contribution towards the problems of the rural population in Burma?—Certainly.

61109. You come down pretty heavily on certain nomadic groups of Indians who move about with large herds of cattle and, in the dry zone, of sheep and goats, paying no land revenue and living a purely parasitic life. Have you any proposals to suggest for dealing with that particular situation?—Yes, I should certainly have them registered to begin with and placed under veterinary inspection. I would have forcible castration of their worst bulls.

61110. Do you think they are responsible for not merely spoiling the type of animal which they own but also, by allowing their bulls to stray as they move about, for spoiling the breeds in the hands of local cultivators?—Yes, they are the people who introduced the foreign breeds, so that you have uncontrolled crossing and the production of hybrids of all kinds.

61111. Have you records of any progressive deterioration in the average of quality?—No records.

61112. Do you feel convinced in your own mind that it has taken place?—During the last twenty-one years I think there has been a great deal more crossing; these herds have increased.

61113. And has a notable deterioration followed?—Yes, undoubtedly.

61114. Are you satisfied with the touch between the Forestry Department and your own?—In Burma we come very little in touch with the Forestry Department.

61115. It would be mainly in the upper tract, if your activities were developed there?—Yes, the forests are mainly in the hills.

61116. You yourself and some of your officers have given us very interesting material on the marketing conditions affecting the main crops of Burma. Would you agree to the general proposition that all these complications and all this unevenness in practice must in the long run tend to the detriment of the smaller man, the cultivator, and to the advantage of the distributor?—Undoubtedly; it is doing so now.

61117. I gather from the trend of the notes provided that the cultivator shows no signs of himself moving for any improvement in the marketing methods; in fact, he is rather suspicious of any attempt to change them; is that so?—Yes, and of course the cultivator himself is not a saint: he has got his own faults.

61118. I did not suggest he was a saint, but I do suggest that even where roguery is the order of the day, he is more apt to come off second best than the man who gets more practice than he does?—That is so.

61119. Would you agree to this proposition, that it is from the spread of literacy and the general extension and improvement of primary education that a greater readiness of the cultivator to work for, and insist upon, improvements in matters like marketing is likely to flow?—Yes.

61120. Until you get a more elastic and wide-awake mind in the average cultivator, you are unlikely, in a country where conditions are such as they are in Burma, to achieve any real improvement in marketing methods?—Quite so, because he is the prey of the more intelligent man.

61121. The whole physical complex, so far as marketing goes, is against the centralisation of exchange in Burma, is it not? It is much more a question of the dealer moving round, partly by water and partly by land, and buying here and there from groups of individuals?—Yes.

61122. And as regards rice, at any rate, I understand from these notes that there is very little possibility of centralising buying and selling at definite markets where the operations could be controlled?—I can see none. I think more might be done in the matter of co-operative selling by co-operative societies.

61123. I was coming to that. There has been very little co-operative marketing, has there?—Very little.

61124. Have you ever known a successful experiment?—No. We had an experiment towards the end of the War in which a society was supplied with departmental selected seeds; we had just got to the stage when the

co-operative marketing experiment was to be tried when the rice control came in and upset the whole proceedings.

61125. I should judge that more might be done to regulate marketing in the matter of cotton. Do you think that is a sound conclusion?—Yes, cotton is grown in more compact areas; we have two cotton tracts, quite distinct from each other. The areas are comparatively small and I think an attempt might be made at the municipal markets of the Berar type.

61126. To what extent, if at all, is the Indian Central Cotton Committee active in Burma?—All that has happened is that they trained one of our men in cotton technology and gave us a small grant, of Rs. 3,500 I think, for the purchase of certain instruments.

61127. Speaking quite broadly, are you of opinion that the cotton situation deserves more attention than it is getting and that substantial improvements might be achieved?—I think we are doing all we can; but, as I pointed out before, the work is difficult work.

61128. It would not necessarily imply any blame or fault if all your problems have not yet been tackled, because, after all, it is natural and proper to deal with more important problems first; that must be the order?—We have given cotton a good deal of attention; when you go to Mahlaing you will have it explained. The cotton cultivator is a very small man, unable to hold up his crop and it is difficult to get seed multiplied.

61129. Do you regard these marketing and economic surveys as enquiries designed really to discover what is going on and not merely as sounding boards for the repetition of what other people for generations have alleged to be the case?—To which enquiries do you refer?

61130. I am referring to the marketing of produce. Do you regard that as important?—Yes. I think it is very important.

61131. Have you any views about general education? Do you wish to add to the general remarks that you have made in your note?—I do not think so.

61132. From the agricultural point of view, you would regard a good agricultural education as of the greatest importance?—I regard it as of the greatest importance.

61133. Have you yourself come into contact with any co-operative societies?—Yes.

61134. What views have you formed about the soundness of co-operative societies?—I would rather not express an opinion. I am not a co-operative expert.

61135. If you have come into personal touch with them, I do not see any reason why you should not tell us what you think of them. If you think they are not sound, please say so?—I hear a lot of talk about it. The general opinion is that co-operation in Burma has not been the success that it expected to be. I know that a great many societies are being wound up.

61136. Do you not think that it is much better to wind up societies that are decaying and moribund and which are alleged and believed to be useless, rather than to add to the statistics of living societies? Do you not think cutting out dead wood is sound policy? Do you not think that a progressive and sound co-operative movement, in its effect upon indebtedness and the possibilities it offers to the rural population, has an important contribution to make to the agricultural welfare of Burma?—Most undoubtedly.

61137. Do you regard co-operation as a very important instrument for adult education?—Yes, very important.

61138. I should like to go back to a point we dealt with a short time ago. I am a little surprised to see that fish manure is not used in Burma. Having regard to the large areas of water, I should have thought that fish manure was very largely used?—It is consumed by the people.

61139. It is all eaten?—Yes. There is a material which is known in Burma as *Ngapi*, which has got a very unpleasant smell. You will probably encounter it on your railway journey. It is in the manufacture of this material that most of the spare small fish in Burma are used up.

61140. Is the use of night-soil against the traditions of the people?—Yes.

61141. The fact remains that night-soil is one of the most important manures, does it not?—It is very important.

61142. It is a very important manure in many countries?—It is the foundation of Japanese and Chinese agriculture. The Chinaman makes use of it in his gardens but the Burman would not look at it.

61143. What is the status of your agricultural engineers? They are not on the cadre of the department?—They are going to be on the cadre of the new department, of the new provincial department.

61144. You are going to find a place for them?—Yes.

61145. Do you regard that as an important reform?—The post is quite as important as any other. There is no reason why any distinction should be made between it and others.

61146. Are you going to appoint any additional agricultural engineers? —The present incumbent is on leave before resigning. We are advertising the post just now.

61147. Are you satisfied with the methods employed in Burma for the collection of agricultural statistics?—I think they are very accurate. I do not do that. I think Mr. Reynolds would be able to speak about that. I think, on the whole, they are quite satisfactory.

61148. Have you any officer engaged, whole-time, on experiments designed to improve agricultural implements, whether large or small?—No. It is part of the work of the Agricultural Engineer.

61149. Do you think there is a future for that?—Yes, I should think so. We have an improved plough which we are distributing. That was designed by one of the Deputy Directors. I think there is a good deal of scope for that sort of work.

61150. You mean, in the direction of further evolving the indigenous implements?—Yes. We have stopped all attempts at introducing the European type of implement.

61151. *Sir Thomas Middleton:* Referring to your staff, you say that your present Provincial Service has only nineteen posts and therefore must be regarded as a selection grade for the Subordinate Service. Do you contemplate a complete separation between the Provincial and the Subordinate Service at a later stage, or do you intend that there shall always be selection for the Provincial Service from the Subordinate Service?—As regards the case of the new Provincial Service, the proposal is to have the service in three grades. The first grade will correspond to the present Indian Agricultural Service. The second will correspond to the present Provincial Service. This is the service on Rs. 300 to Rs. 800. The third will correspond to our present Subordinate Service.

61152. My question is this: Do you contemplate that it will be possible to pass from the Subordinate Service by promotion through merit to the Provincial Service?—Yes, that is intended. Number three of the new service will have to be filled up by graduates from the Agricultural College. From grade 3 they will go to grade 2 by promotion.

61153. Will men in grade 3 go to grade 2 by promotion, or will there be appointments direct?—That is to be mainly by promotion, I think.

61154. Assuming, as you suggest, that central research work should be greatly strengthened, in such a subject as veterinary science, for example, you still think that local research in veterinary questions should be prosecuted in Burma?—Yes, I see no objection to provincial research as well.

61155. You say in your evidence that there is a great field for veterinary research in Burma. What I want to know from you is whether that research should be local or whether it should be conducted for you in some central institution under the Government of India?—Well, when I wrote that, I was not thinking about the central institution at all. What I meant to say was that there were a great many problems in Burma. These problems may be tackled, some of them in Burma and some of them at the central institution.

61156. Assuming a central place to exist, would you say that there is still a case for local research work in Burma?—Yes, because, for example, in Burma we have the elephant which is an important and valuable animal. I think it is more used in Burma than in any other Province in India and research work on elephants might be provincial.

61157. You draw attention to the new farm schools which you are experimenting with. What is the cost to the State of the education in these farm schools?—I have not worked it out at all.

61158. The cost is quite small, is it not?—It is only an experiment as yet.

61159. You have one teacher. On what salary?—He is a graduate of the Agricultural College on Rs. 150.

61160. He teaches ten pupils?—Yes.

61161. You say that you are not in favour of special demonstration farms. Generally speaking, I think I should agree with you but I want to ask you if there are not special circumstances connected with certain crops for which demonstration farms might be necessary. I am thinking of a crop, like tobacco, for example, where a curing plant is essential, or as we have seen in other Provinces, sugarcane, where small white sugar plants were being worked. In special circumstances, would you agree as to the necessity for a demonstration farm?—Yes, in special circumstances like those. As a general rule, demonstration to the actual cultivator should be on his own fields but where you have a demonstration which involves industrial operations as well as agricultural, then you should have a special station for it.

61162. I have had a good many classes of students, but I have never had your Burman experience. Is this experience to be taken as a tribute to your powers as reformers?—We get these types of students where people want to get rid of them for the time being.

61163. You found your suggestions for organisation of research on the American system, that is the federal system in relation to the States. You deal with that subject in Question 4 (*a*). Do you recognise that the carrying out of such an organisation may be very expensive?—I suppose it is.

61164. When you recommended that system for India did you go into the question of cost?—No.

61165. Did you ask yourself the question to what extent the success in America may be due to the dollar on the one hand or the prestige of the Central Authority on the other?—I know the Federal Government makes large grants to the various States, but I do not think, on the other hand, that the States contribute to the Federal Government.

61166. They work in co-operation; in all these research stations the individual State puts down so much money and the Federal Government puts down so much. Then you expand, in a supplementary note *, your ideas on the relation between the Central and the Provincial Governments in India. You state that in a federal system the Central Government of necessity must have the highest prestige and it follows that so must its varying subordinate departments. When you were talking of departments did you include research departments?—Yes.

61167. How is the prestige of a research department to be secured?—I think the United States Central Department has certainly got a higher prestige than any of the State departments.

61168. There are individual workers in the State institutions with a higher prestige than many of the Federal officers. Is prestige in these research questions not entirely personal?—I suppose it is largely so.

61169. You cannot purchase it either with rupees or with dollars?—I was not thinking so much of individual prestige as of the prestige of the department.

61170. I asked you if the departments include the research department?—Yes, I said that was so.

61171. Would not the Central Government be in a better position to recruit men of outstanding ability?—That is really what I mean. I think it will probably be rather difficult for the Provinces to get men of very high qualifications in a few years' time.

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* Appendix, page 13.

61172. The Central Government would be in a better position, financially, to recruit than the Provinces?—Not merely financially.

61173. Then in what other respects?—Well, it comes back to the same thing as I said before, namely, that the Central Government has got the highest prestige.

61174. You refer to the reserve of officers who would be maintained for filling eventual vacancies. I take it that the officers you have in mind would be acting as research assistants in research institutions?—As junior officers attached to the central department, who would be available for provincial posts. Just now we cannot get a man to go from one Province to another.

61175. You point out that there are certain problems which are best dealt with provincially and others which can best be tackled centrally and you give us examples of those cases in which the central department could assist the Provinces, namely, insect attacks, fungus attacks, animal nutrition and so on. Would not the same advantage accrue to the work of the Province from the activities of any competent research worker in any institution?—Attached to a Province he would not have the same facilities for touring, for getting into touch with the men in the other Provinces; he would not be so mobile. I think that is the point I want to bring out.

61176. You suggest that the Board of Agriculture should be retained in order to afford opportunities for conferences. From your experience, would you agree that there has not been nearly enough of conferences in the past, especially between the specialised officers of the Provinces?—I think that is correct. There ought to be more opportunities.

61177. The facilities have not been enough?—Yes.

61178. You suggest the setting up of a Central Agricultural Research Committee. There would be representatives from each of the sections or bureaux of the central department, representatives of provincial departments, and from the Chambers of Commerce. What size of committee do you contemplate?—Probably about twenty to thirty members.

61179. Would this committee deal with projects already approved by the Government of India?—I propose that the old Board of Agriculture should continue, and all possible subjects for agricultural discussion should be brought before the Board and threshed out by that body. The Board should make recommendations to the Government of India as it has done in the past, and the Government of India would then give its sanction to such of these proposals as it approved of.

61180. The scheme would go, as at present, to the Government of India and come back?—Yes. This research committee is to be entrusted with funds which would be non-lapsing.

61181. Had you in mind the amount of the fund that would be placed at the disposal of this committee?—No; that would have to be worked out in detail.

61182. Do you not think that it would be a very difficult matter for a committee, constituted as you propose to apportion funds. You must remember that certain applicants are very strongly represented on the committee. Others are only partially represented, and it would be left to the members of the Chambers of Commerce to see that justice was done?—I admit that that is a difficulty but I cannot think of anything else. Have you not got the same difficulty just now?

61183. The Cotton Committee deals with one specific subject; it does not cover the whole range of agricultural questions. The difficulty would be that, if you had thirty persons selected as you suggest, their opinion as represented by a majority vote on one specific point might be of little or no value. Then you suggest that there should be in addition to the Agricultural Adviser, a Director-General of Central Research. What should the relation be between these two officers? Would they be colleagues of equal standing or do you contemplate one senior and the other a junior officer?—The Director-General of the institute must be a junior officer to the Agricultural Adviser; I do not see any way out of this.

61184. Returning to your written evidence, Question 9 (*b*), is the quantity of silt deposit in Lower Burma considerable?—No.

61185. Conditions are quite different from those on the Nile?—There is practically no silt contributed by the Irrawaddy, although the statement is often made that the rice-fields of Lower Burma are fertilised by silt. This statement is quite untrue and I do not know who is responsible for it.

61186. No marked deterioration has been visible in the rice crops?—No, we have got down to a more or less uniform constant yield stage, that is, the point beyond which the outturn cannot fall, in normal years at least.

61187. You have tried making of artificial farm-yard manure and found this not profitable. What are the reasons for that?—Mr. Hendry will be giving evidence before you and he will be able to give you the figures. He found that it simply did not pay, and that the balance was on the wrong side of the account.

61188. The only material to purchase would be sulphate of ammonia?—Yes, but he said that it did not pay as well as cattle manure. I have not got the details with me just now, but he will be able to answer you in full.

61189. You recommend that the importation of cattle from India should be stopped. Is the trade large?—No.

61190. Are the figures of imported cattle available?—Yes, the Customs people ought to be able to give the figures.

61191. Do the Burmans ever store *juar* straw for more than a single season?—Yes, I have seen it done, but it is not usual.

61192. Is any grass hay made in Burma?—No, not to any extent, that I know of.

61193. Assuming that cultivators wanted to make hay in any part of Burma, would they experience difficulty in finding the material at a season when hay could be made?—Yes, I should say so; it would be very difficult as there is no material to make hay with in Lower Burma.

61194. What about Middle and Upper Burma?—That is dry country; there is a little grass during the rains, but the supply is very small.

61195. Are there no forests?—You might possibly make hay in the forests.

61196. Is there no baling of hay in the forests?—No.

61197. You do not have fodder famine?—There is scarcity at times, but nothing in the nature of a famine.

61198. There is scarcity every year ; that is what we gather from your evidence?—There is a seasonal period of scarcity.

61199. The cattle are starved?—They are hard up.

61200. Who runs the oil-mills which crush cotton seed in Burma?—Two or three large firms; two European firms and one Japanese firm. Then there are the smaller mills which are owned largely by Burmans and Indians.

61201. Do small mills crush cotton seed?—Not cotton seed, I beg your pardon. I was thinking of groundnut oil-mills. Cotton seed is crushed by two European firms and one Japanese firm. They also crush groundnut.

61202. Where does the cotton cake go to?—Perhaps to Europe. I do not know which country it goes to.

61203. I gather from your replies to Question 23 (*b*), on education, that you are satisfied that what the Burman wants is a short course for adults, so far as technical education is concerned?—At the present stage, yes.

61204. How many weeks' time does this course take?—We gave this year a single cultivating season, beginning from the end of June and ending by the end of January. I have not decided yet how long the course will be.

61205. At what ages do you get the boys?—At the age of eighteen; some are twenty; some are older.

61206. But all of them have had a good deal of experience of work on the land?—Yes; as far as possible we select them. The district staff make inquiries and select men who are likely to be of some use to us after taking the course.

61207. Are you satisfied with the few that have already been turned out?—Some of them are doing quite well.

61208. *Mr. Calvert* : I think you told the Commission that communications in Burma were on the defective side. Do you think the lack of adequate communications restricts the spread of cultivation?—I think it is doing so in Tenasserim. That is a huge country which might be opened up to planting crops, but it is not yet opened up because of the want of railways. At the same time it is true that there has been a great spread of rice cultivation in places with only a very incomplete railway system, but you must remember that there is a wonderful system of waterways which has made up for it.

61209. One gentleman who has sent in a written statement says that four times more crops would be grown if you only have good cart-tracks. Do you go as far as that?—No. I do not know on what he bases that.

61210. Do you think there would be greater extension of cultivation if communications were improved?—Yes; that is what takes place. The increase in the cultivation of potatoes and in the export of potatoes from the Shan States took place simultaneously with the extension of the railways to the tracts where this crop can be grown.

61211. Have you not mentioned also that the elephant presents a large problem in veterinary matters?—Yes.

61212. I understand that elephant diseases could not be well investigated at Muktesar. Are there any other problems of a veterinary nature which could not be investigated at Muktesar and for which you require local research stations?—I cannot answer that question. I think you had better ask Mr. Rippon, who is the expert to give evidence on that question. It is just possible, I think, that Burma may have certain organic diseases of animals which the rest of India may not have.

61213. You mention that the practice of yearly tenancy is against the conservation of cattle manure. Is that based on observation, or is it just a theory?—It is based on observation. I have seen yearly tenants in the Pegu district throwing their cattle manure in a creek with a view to getting rid of it.

61214. Do the tenants leave their holdings at the end of the year, or do they go on from year to year?—The tenants are removable at the end of the year; if a man is not sure that he is going to have the land under his cultivation for the next year, there is no particular motive to make him conserve his manure or to do any improvement.

61215. You actually do have problems here connected with tenants who leave their farms at the end of the year?—Yes; undoubtedly.

61216. With regard to this question of irrigation of the delta, what cold-weather crops can you raise if you have irrigation?—I cannot think of any. The paddy crop is not off the ground till January. Supposing you have irrigation, you have only February, March and April to get the crop off, for down comes the monsoon in May. It may not be an insoluble problem, but it is going to be a difficult one.

61217. You have mentioned the indiscriminate crossing between Indian and Burmese cattle. Are bulls imported from India?—Yes.

61218. I think you are opposed to the idea of special economic enquiries. Is that based on a study of such special economic enquiries as have been carried out? Are they useless?—Did I say they were useless?

61219. You say the result will reveal nothing new?—What I was thinking about there was that we have already got a tremendous amount of information in settlement reports.

61220. That information is not economic information; it is obtained for the specific purpose of assessment?—I think a lot of it is of decided economic value. The Settlement Officer makes enquiries about indebtedness, cost of cultivation and cost of living, and these are detailed in the settlement report. I think if we had a competent statistical officer to compile the figures and put them into shape periodically, it would be a better step than making new enquiries.

61221. You have seen the reports of the enquiries carried on in the Punjab by the Punjab Board of Economics?—I have seen them.

61222. They give information which is not to be found in the settlement reports?—I have not read your Punjab settlement reports, but I agree that what you have done in the Punjab is very valuable.

61223. As regards your suggestions for an All-India organisation, you suggest that the Indian Central Cotton Committee should come inside that organisation. But have you considered that it is mainly a non-official body? —Is it entirely non-official?

61224. I say it is non-official?—But you have Government officials running it.

The organisation as such is non-official; it is not a Government body!

61225. Take a better instance, the Indian Tea Association. It is a typically non-official body. How would you bring that non-official body into a Government organisation?—I can see the difficulty. I was thinking more of what remains to be done in the future than of what has been done in the past.

61226. Then, within your organisation you have either to leave out the non-official research organisation out or bring it in?—Yes; would they not agree to come in voluntarily?

61227. Do you think there would be any difficulty in having a non-official body like the Indian Tea Association inside the Central Government organisation?—Supposing Government said "We will do it the other way for you; you will get the same amount of good if you accept this reorganisation," do you not think it would be agreeable?

61228. Did you ask the Indian Central Cotton Committee whether they would agree?—No.

61229. Do you think it advisable to have organisations on the lines of the Central Cotton Committee for special crops like sugarcane and rice?—Yes.

61230. Any other crops that you can think of?—I do not know about jute; Bengal may want to do it provincially.

61231. *Dr. Hyder:* What is this system of industrial agriculture in Lower Burma to which you refer?—That term is sometimes used to describe the stage which Lower Burma agriculture has come to. The land was originally under a system of peasant proprietorship. People went down from Upper Burma, cut through the jungles and got so many acres under paddy which they grew for their own requirements, and there was no outside market at all. Then, in 1869, the Suez Canal was opened; it gave an impetus to trade of all kinds from the East, stimulated the paddy trade, the prices of paddy went up, and the peasant proprietor found that he could not only supply his own wants and the wants of his family but could also sell his surplus paddy as well. He then went on taking in more land, till he finally got to the stage when he had more land than one man could look after. Then came the stage of the landlord, the non-resident man, who simply owned land, but did not work it. He went to the nearest big town, rented this land out to tenants, and simply sat and drew the rent. That is the stage which we have reached now. We have got non-resident landlords living in the big towns, the tenants of these landlords who are more or less migratory, cultivating here one year and there the next, and a still further stage in a completely landless class of labourers.

61232. But, is not the land cultivated by small people? Is it not agriculture on a large scale?—The actual cultivator may cultivate as much as forty to sixty acres; in the Hanthawaddy district near Rangoon, it is quite common to find a tenant working sixty acres of rice land.

61233. You mention, in some of these notes, that there is a large demand for capital, and, on the other hand, in some of the papers supplied by the Burma Government, it is stated that very little use is made by the cultivators of loans under the Land Improvement Loans Act?—I think the total amount of loans issued under the Agriculturists' Loans Act was about twenty-seven lakhs of rupees and the amount under the Land Improvement Loans Act was something like one lakh to two lakhs, a very small amount. I do not get your point.

61234. My point is this. If there is a large demand for capital, and the Government is ready to advance loans for the improvement of the cultivation of land, there are the two sides. What is then the difficulty? Why do not the cultivators draw large sums from the Government under the provisions of that Act?—These Acts have always been rather unpopular, I am afraid. There is the usual explanation that there is so much worry and trouble, both in getting the money and in paying it back.

61235. As regards improved implements, leaving aside tractors and other machinery, what scope is there for small implements of an improved type, which the ordinary cultivator having to cultivate five to twenty acres could make use of?—I think there is very considerable scope for it. As a matter of fact, one decided improvement that has taken place in Burma in the last twenty years, since I came to Burma, has been the introduction of the plough in the dry zone in the cultivation of cotton and groundnut. When I came here first, I was put by Sir James MacKenna to agricultural surveys of some of the districts. In the Myingyan district, whenever I made enquiries I was always told that they never used the plough, and I do not think I ever saw one. The other day I was out there, and I found the use of plough was quite general. It is a small indigenous plough.

61236. Could you give us any other instances in which the great strain of hard physical labour is taken off from the cultivators, for example by chaffcutters, or something of that kind?—There is the cultivation of the groundnut in rows. Originally, it was scattered broadcast, but now they grow it in rows, and that makes for a big saving in labour. It is more easy to weed and it is more easy to harvest.

61237. If you had an efficient department which concerned itself with the improvement of the indigenous implements, do you think there would be considerable scope for the introduction of such implements, not necessarily complicated and big machinery?—There is considerable scope for it.

61238. In these schools which you maintain for agricultural education, you pay the students twenty to twenty-five rupees per month?—We pay them twenty rupees a month.

61239. How many scholars have you got?—Ten.

61240. Is the amount enough, or do they have to spend something from their own pocket?—I think twenty rupees is quite enough to keep a lad in a jungle village.

61241. As regards the system of marketing, is there any possibility of introducing a uniform basket?—I think there is a possibility if Government enforces it. It has to be enforced and to be made legal.

61242. The present system is a complicated one, and one does not know exactly what the contents of a basket would weigh?—It is very complicated indeed. Every district has practically got its own basket.

61243. According to the beliefs and customs of the people here, would there be any prejudice against the castration of young animals?—None.

61244. Are there any districts in your charge in which the vitality of the people has been reduced on account of disease?—Yes.

61245. Could you mention some?—Minbu in Upper Burma is one. Parts of Minbu are very malarious, and the malaria there has certainly had its effect on the people. There probably are many other districts, but that is the one which comes to my mind first.

61246. As regards plant diseases, how would you go about the business as between India and your own Province? Some of the diseases which you mention can be introduced into Burma by the importation of plants or of seeds?—Yes.

61247. How would you make a distinction between importation for seed purposes and importation for general consumption purposes?—I do not know what distinction is made just now.

61248. The position is this: If legislative action were enforced, that might lead to the stoppage of all imports of *juar* or other cereals?—I quite see your point. We would require some sort of help in the shape of certificates.

61249. You must see the other side of the picture also. You are an exporting country, and India might throw out of gear the whole of your export trade?—I think it will be easy to prevent a catastrophe of that sort.

61250. Has your provincial department benefited by the activities of the department under the Central Government? Take the example of rice: What benefit have you derived from the research carried on under the auspices of the Central Government, so far as rice is concerned?—None.

61251. None whatever?—Because we have always regarded rice as purely a provincial problem. We have not sought the advice of the Central Government in the matter of rice. I am not quite correct in saying none, because we have had advice regarding fungoid and insect diseases of rice. But, so far as the breeding and improvement of rice are concerned, we have had it all in our own hands, and I think we intend to keep it in our own hands.

61252. Take groundnut: Have you been benefited by the researches of the central department?—I do not know of any research that has been done by them in groundnut.

61253. By research, I mean improvement of the crop, improved varieties of groundnuts?—We have introduced new varieties ourselves.

61254. Take the case of cotton: In Burma, have you benefited by the accumulated knowledge and experience in India?—We have introduced a certain number of Indian cottons, but I do not think we are indebted to any particular agricultural department in India for help in connection with cotton.

61255. If that is so, talking of groundnuts, rice and cotton, your work must be self-sufficient?—There are many other problems. You are fixing on crops, but there are such problems as soil problems, the problems of plant nutrition and soil physics.

61256. Take these problems: In what manner have you been benefited by the Central Government?—We have had the benefit of the researches at Pusa. We have read their memoirs; they helped to guide and direct our experiments here. It is very difficult to put it actually in terms of money.

61257. Does this benefit arise from a diligent study of the reports issued from Pusa, or does it arise from the advice and visits of the central officers into your Province?—Both ways. The early memoirs of Pusa were of the greatest benefit to us. For instance, the memoirs of Dr. Howard in connection with plant breeding and plant genetics were of the greatest value to us.

61258. You might be benefited in the same way by reading the memoirs written by the agricultural departments of some other countries possessing the same climatic conditions?—What other countries?

61259. Take the Dutch East Indies?—That is a different matter. I do not think the Dutch East Indies specialise in any of these crops. They grow rice, sugarcane and rubber, and that is about all.

61260. Have you got many more crops here, so far as these fundamental problems are concerned?—Why should we not have our own organisation? Why should we benefit from the Dutch East Indies organisation?

61261. You suggest a strong central department. What is the amount of total benefit that you have received, and what benefits in future do you expect to receive, if the central organisation were considerably strengthened and intimate relations established between the central organisation and your own department?—There are problems which are of All-India importance, which might be most economically studied at a central station by some central authority. I have specified some of them. I have also pointed out that the central department has the prestige, and that a central officer is more mobile than a provincial officer. He can get from one Province to another; he has opportunities of getting into touch with men in different Provinces. But a man in a Province is limited to his own Province.

61262. Supposing it were worked from the provincial side, that your Government were requested to depute you and the officers working under you to visit not only the different Provinces in India, but the Dutch East Indies and so on, would that be of greater benefit to you, or would the

central department bring you the greater benefit?—The central department would bring us the greater benefit, because it is problematical whether our Government would allow us to go to the Dutch East Indies.

61263. *Mr. Reynolds:* You stated, I think, that the buffalo stock in the country was definitely decreasing?—I think that is so.

61264. Would you be prepared to amend that statement and to say that it had reached a stationary position during the last four or five years. I see that the statistics, for what they are worth, in the season and crop report, show it to be entirely stationary and to have been so for about five years, there being practically no variation with regard to bulls, cows or young stock?—Yes. I think the numbers have gone down proportionately to bullocks in the last twenty years.

61265. Proportionately the bullocks have increased?—Yes.

61266. You stated that you did not think waterlogging was a serious problem in Burma?—We have got plenty of waterlogging in Lower Burma.

61267. Was that statement in reference to Upper Burma only?—I cannot think at the present moment of any particular area where waterlogging is a serious evil, unless you mean flooding.

61268. You would not include flooding?—No, waterlogging is not flooding.

61269. Waterlogging occurs when you are unable to get the water off the ground?—Waterlogging I take to mean the saturation of a soil with moisture so as to prevent cultivation.

61270. Then you except flooding from that statement?—Yes.

61271. The settlement instructions have always contained orders for the settlement officers to make fairly full enquiries as to agricultural methods both past and present. Has it been your experience that the descriptions given in the reports are on the whole fairly full?—Yes. They vary, of course, from report to report.

61272. In some cases they are very full?—Yes, some officers who are interested in agriculture enlarge on the subject; others who have less interest do not write so much.

61273. But taking them in the aggregate, you would expect to be able to find, somewhere or other, a fairly full description of the agriculture of any particular period?—Yes. You mean the agricultural economy?

61274. Yes?—Not the actual agricultural practices but the condition of the people.

61275. Yes, and the practice as well?—Yes.

61276. I think you stated that, in effect, Lower Burma is not receiving a top dressing of silt. You would agree that it is the system of *bunding* which is preventing it from receiving very large quantities of silt at present?—No.

61277. You would not agree?—No, I would not agree with that, because the supply of water in Lower Burma is not river water at all; it is rainfall. The water supply of the paddy crop is rainfall.

61278. You do not think that low-lying areas in some districts could be silted by any system of sluice gates letting in flood water through the embankments, on the top flood?—Quite possibly, very likely. It is purely an engineering question. We know the silt content of the Irrawaddy river. Our former Chemist, Mr. Warth, did a rather elaborate investigation into the silt content of the water and we know exactly how much it carries down and how much it would deposit.

61279. *The Chairman:* And its agricultural value?—Yes; we can give an analysis of it too.

61280. Is it rich?—Yes, we know it is because the islands along the river get manured every year with that silt, and they are about the richest soils in the Province; they are the soils in which all our tobacco is grown.

61281. *The Raja of Parlakimedi:* In Burma what are the diseases from which paddy suffers acutely?—Very few. We have a few insects which attack the plant; there is one insect which pierces the stem of the plant, rings round the stem and kills the ear. There is the borer, there is the rice

hispa which sucks the grain, and there are several more or less obscure fungus diseases which do a little damage but not much. On the whole, the rice crop in Burma is very free from attack either by insects or fungi.

61282. Have any of these diseases been successfully tackled by the college laboratory?—As I say, the damage is so slight that we have not really done much investigation on the matter. The cure for most of these insect attacks is to burn the stubble. The attacking insect usually hibernates in the stubble, hence if you set fire to the stubble you kill off the insect. This practice is quite well known to the cultivator.

61283. The local cultivators do it?—Yes, burning is a fairly common practice.

61284. The local landowners lease out their holdings largely, do they not?—Yes, they do.

61285. People from what country take up the cultivation?—Mostly Burmese, people of this country.

61286. Do any Indians take up leases?—Yes, a certain number, but the Indians come mainly as labourers and go back again.

61287. Not as cultivators?—Not usually; the amount of land in the hands of Indians in Burma is comparatively small.

61288. For what period usually do these leases run?—I think they are usually yearly leases.

61289. How does the landowner collect his share from the cultivator?—That is rather a difficult question to answer; it depends on the arrangement made between the landowner and the tenants, and the relations between them; very often the landowner is a moneylender as well.

61290. *The Chairman:* Is it ever in cash?—No, it is mostly in produce. What he does is to advance money during the cultivation season in return for so much paddy at harvest time. There is a varying rate: the earlier is the season, the bigger is the sum advanced against each hundred baskets of paddy.

61291. *The Raja of Parlakimedi:* So that the system of leasing is not detrimental to the conditions of agriculture in Burma?—I think it is; I think the relations of the landlord and the tenant should be regulated.

61292. As the produce is shared in kind, I suppose both the parties take sufficient interest to see that the maximum production out of the land is effected?—Yes, there is that to be said for payment in kind.

61293. In your note among manures you mention ammo-phos. May I know what it is rich in?—It is ammonium phosphate. It is made in America, I think at Niagara, but I am not quite sure. Anyhow, it is exported from America; it is made from synthetic nitrogen which is made to combine with phosphate rock, giving an ammonium phosphate. It is sold in two grades; one grade is twenty per cent nitrogen and twenty per cent phosphoric acid; in the other one I think, but am not quite sure, the proportions are 13 and 48. The Agricultural Chemist will be able to give you the full details about that.

61294. In what areas of Burma would you suggest that this should be largely applied?—It is primarily for paddy cultivation. We already know from experience that certain areas have infertile soil and give lower yields than other areas, and, as described in my note, the Chemist is doing soil surveys. He intends to make a complete survey, in a rough way of course, because to do it in detail would be very costly and elaborate. He intends to do a rough survey of the whole of the Lower Burma rice districts, beginning with the Pegu district. He is now actually doing the district of Pegu and in addition doing one Upper Burma irrigated district.

61295. Are the cultivators taking it up to any extent at all?—We have not asked them to; all we can say is that it is the most promising manure we have tried up to date.

61296. Are not the local cultivators accustomed to make use of any manure at all?—Yes, they make use of farmyard manure; but the amount of that available in this Province is only just sufficient to manure the nurseries; there is not enough to go round in the transplanted fields.

61297. Do they look after the manure in a manner to preserve all its required qualities?—No; it is very poor stuff at the best, the manure of working bullocks; but it is better than nothing.

61298. You say they do not make use of sheep manure in any form?—Not that I know of. The sheep are mainly kept by wandering nomad people; they have no fixed habitation at all. I suppose if any use is made of the manure, the whole countryside gets it; it is not collected or sold or anything of that sort. I should think it would go upon the jungle and waste land; that probably helps to increase the growth of grass in waste land.

61299. In the Presidency of Madras, though sheep are kept by people who wander about, they come into the paddy-growing areas in certain seasons and are used for penning?—Yes, I know that practice. I do not think that is common in Burma. At least, it has not come to my notice as yet; it may be done but I do not know of it.

61300. You say the area under groundnut has been increasing; may I know what crop it has been replacing largely?—Millet and sesamum. Probably it did not replace those so much as to extend into waste land. I think it is possible that a lot of the groundnut which is grown now is grown on land which was probably under jungle before, waste land, grazing ground.

61301. Is the seed exported, or is any oil extraction done in the country?—Oil extraction is done in the country. Both the oil and the cake are exported.

61302. Is any percentage of cake available for manurial purposes?—It is not used as manure at all.

61303. Do they make use of it as fodder for the cattle?—They use sesamum and some groundnut too, but mainly sesamum cake.

61304. In answer to Question 3 (c), you say that you have been trying to improve several crops. Are you trying to improve the quality of rice in Burma or trying to improve the quantity?—Quantity and quality. I hope when you go to Hmawbi Farm on Sunday morning you will be able to see, on the spot and in detail, what we are doing to improve rice.

61305. Do the cultivators care more for quantity or for quality—Quantity.

61306. Do not they always get a better price for the better quality of rice?—They want to grow good rice as well.

61307. There is a great demand for paddy of a better quality, is there not?—Yes.

61308. As regards the boys who come to your school, have you been maintaining statistics to show how many of them have gone back to their own land after completing the course?—We have not had sufficient experience.

61309. Have any of them gone back?—One or two have gone back. Are you referring to the boys who are coming to the farms or to the school which I mentioned?

61310. My idea is this: Does the local Burman make use of his knowledge in agriculture to improve the local conditions of cultivation?—I should say yes. Those boys who come to our farms go back and take advantage of what they have been taught. I know of one case where a boy came to the farm and introduced sugarcane cultivation in his village. Now there is a considerable industry in sugarcane-growing and there is jaggery-making in the village. That is one instance that comes to my memory.

61311. That is the best way of carrying on demonstration, is it not?—The best way to demonstrate is to demonstrate in the cultivators' own field, on the spot, in his own village.

61312. To go back to the boys in the farm schools. You said you had been getting boys of very low quality. You said that people who are not wanted in the villages are sent to the farm schools. Is there any improvement in the calibre of the boys you get now?—We do not always get these people of course. We occasionally get them. What I want to emphasise is that unless we choose the men ourselves we are apt to get

men coming who will not be of much use afterwards, who will not benefit by the course. That is the point I wanted to make and certainly we got, in some cases, the scum of the village.

61313. May I know what progress has been made by Government, so far, in carrying out the required improvements in indigenous cattle?—We have opened a stock-breeding farm but up to now nothing has been done. We are opening a farm this year and intend to purchase young stock now.

61314. Who is in charge of livestock improvement?—One of the Deputy Directors.

61315. You also mentioned that the supply of serum from Muktesar is very much delayed sometimes, and that it goes somewhere else before coming to Burma. Is there no place which you could have in Burma, to assure a better supply?—That has been considered before. The question of a special serum institute for Burma was considered by a committee which met in 1924 to consider the methods of working of the Agricultural and Veterinary Departments. This committee considered the question of a serum institute for Burma and turned down the proposal on the ground, I believe, of expense.

61316. Are the local people making full use of the veterinary help that is available?—Outside our activities in connection with the control of cattle disease, we have only got four dispensaries in Burma. I think the people in the towns where these are situated take a considerable amount of interest. The number of cases treated is increasing year by year and I know that the staff in the districts do a considerable amount of work in advising people about their animals and in curing animals' ailments.

61317. Do you think that an increase in staff will mean that advice will be brought more within the reach of the people?—I am not quite sure whether an increase of staff would do that or not. It has been suggested that district councils should take over and control the Veterinary Assistants in order that the responsibility should be thrown on the local people. That is only a suggestion so far.

61318. As a preventive measure against rinderpest, are the people prepared to accept inoculation by veterinary people?—Yes, a considerable number of animals are inoculated every year and the numbers are growing. I think inoculation is becoming more and more popular.

61319. Is the serum-simultaneous method of inoculation more popular than the serum-alone?—We have no serum-simultaneous in Burma, or, at least, we have not had it for many years. When inoculation began it was the serum-simultaneous method that was used, but it was given up as being too dangerous in the hands of untrained men.

61320. *Sir James MacKenna:* With reference to the question of cattle-breeding, does the subject remain with the Agricultural Department or is it dealt with by the Veterinary Department?—It has gone back to the Agricultural Department.

61321. So that, at present you are the Veterinary Adviser? Is that a permanent arrangement?—I cannot tell you that. Perhaps Mr. Dunn will be able to tell you what is being done. I have a sort of idea that that is contemplated.

61322. With reference to this All-India Research Council you propose that the Council should consist of experts of the Imperial and Provincial departments, together with a certain number of business men, but you were not in a position to satisfy Sir Thomas Middleton that these two or three business men would be in a position to help the Council very much in the matter of formulating a policy concerning lines of investigation in which they are not personally interested. Could that difficulty be got over by having the Council working in sub-committees so that you could attach your business representatives to the particular branch in which they were interested, for instance, sugarcane or cotton?—That is one solution.

61323. Would you favour the Commission with a diagrammatic representation of the principles underlying your theory of seed distribution, indicating what safeguards you have for purity?—Do you wish me to state that now?

61324. You could send in the diagram?—I can get that done. I will make a note of it*

*Not printed.

61325. Has any action been taken in regard to the agricultural improvement committees that were recommended by the 1925 Committee?—Five have been started. One at Meiktila is working fairly well. I have suggested starting three others in connection with the question of cotton seed.

61326. Where?—I want these started for this particular purpose at Myingyan, Myinmu and Allanmyo. The cotton seed problem in Burma is getting rather difficult. As you know, the cultivators send all their cotton to the large ginneries and go back to them for their seeds. The germination percentage is sometimes not more than twenty.

61327. The Chairman is the Deputy Commissioner?—Yes, the Deputy Commissioner or the Deputy Director.

61328. What are your views on the subject of the training of Burman for higher posts. Are you going to promote men from grade 2 or are you having direct recruitment?—To the best of my recollection we are allowing about twenty per cent of the cadre to be promoted from grade 2, the rest to be advertised for in the usual way.

61329. What are your views about the training of Burmans who have gone through your own hands? At what stage would you send them to a foreign country for a specialised course? Is it on the completion of the college course or after they have done a certain amount of work under an expert?—After they have done a certain amount of work under an expert. That experience is invaluable.

61330. To show his capacity for research work?—When his capacity is proved in that way, I would then send him to a foreign country for further training.

61331. What are your views about the functions of the Deputy Director? Do you think it is essential that the Deputy Director should undertake original research work or would you allow him to wander about as a propagandist?—I think the present arrangement under which the Deputy Director controls the central experimental farm and also the district work is the best arrangement. It is essential that the district farm be kept in touch with the outside work.

61332. And that the Deputy Director should be a research worker?—He should be the field research officer.

61333. Have they got any further with the water-hyacinth problem since I left the country?—Not that I know of.

61334. In view of the fact that Bengal, Assam and Burma have all been very seriously affected by this pest, do you not think that the question should be centrally attacked instead of as at present? Is it not really a question which the Government of India could take in hand by getting an expert to deal with it?—I have not thought of the matter.

61335. Is it on the increase in Burma?—I should say so.

61336. Do you regard it as a serious retardation of the commercial development of agriculture?—I do not think it is so serious in Burma as it is in the other Provinces.

This is the first time I have found such a view expressed on this matter!

61337. At present there are two vacancies in your staff, one is that of an Economic Botanist and the other that of the Engineer. What steps are you taking to fill those vacancies?—The Government here have asked the High Commissioner for India to advertise, and there will be a Selection Board in London.

61338. Do you know whether that is to be on a short-term agreement?—It is to be a short-term agreement in the first instance, with confirmation at a later stage when the applicant has been found suitable.

61339. What has been the attitude of the Legislative Council during the time you have been Director?—I think, on the whole, it has been friendly.

61340. Has there been any difficulty about money?—You may remember that in 1924 we had some of our schemes turned down by the Finance Committee when that body was first formed. That was probably due to overconscientiousness on their part.

61341. Are you continuing agricultural surveys?—Yes, but not exactly of the same kind as we did in the beginning. I had a survey on marketing done and the papers were sent to this Commission, and again, recently, I had a survey into stock-breeding in the Province.

61342. Surveys of special subjects rather than a general territorial survey?—Yes. Another survey was on the possibilities of coconuts.

61343. With reference to Pusa, you are inclined to think that the standard of work there has deteriorated?—Yes, probably. It does not seem to be doing as good work as it did, say twenty years ago. Perhaps my own estimation is wrong, but I have heard this opinion expressed by others as well.

61344. Do you think that, in the circumstances, it would be better to recruit for Pusa from the best men available and not to recruit from the Provincial appointments?—I should say so.

61345. So as to get men of outstanding reputation?—Yes.

61346. *Professor Gangulee:* In regard to the question of recruiting scientific officers in England, what is the exact procedure adopted? You ask the High Commissioner for India to advertise and then what happens?—The High Commissioner appoints a Selection Board and the candidate appears before that Board.

61347. What is the composition of the Selection Board?—That is suggested by the Local Government. I think it usually consists of one or two senior officers of Government who are at home on leave, and one or two experts on the particular subject for which the officer is being recruited.

61348. Do you consider this procedure satisfactory?—I do not know of any better.

61349. With regard to the facilities for research in your own Province, you have a number of central farms?—Yes.

61350. You have eight central farms in eight circles and there you carry on research in rotation and so on, and you have expert specialists, research officers, working in the Mandalay Agricultural College?—Yes.

61351. I want to know how you draw up the research programme? Have you a council to discuss the problems?—No. So far as the College is concerned there is the College Council which consists of the Principal of the College and the individual members of the staff. That body sits monthly. It discusses all matters connected with the College, not only matters of detailed research but also matters of discipline of the students and matters like that. In addition to that, I hold departmental conferences. I try, if possible, to have a departmental conference twice a year, at which programmes are drawn up and discussed.

61352. So that the departmental conferences to which you refer are the links between the specialised research officers and your field research officers who are the Deputy Directors?—No, we used to have that. I used to hold one departmental conference for the whole Province but I have now adopted the method of having a conference of the College staff, a separate conference of my dry zone Deputy Directors and a separate conference of my Lower Burma Deputy Directors, because a good deal of time was wasted at the conference through the men in Lower Burma not being really interested in what was being discussed in regard to Upper Burma.

61353. So that the men out in the field, the Deputy Directors, are familiar with the problems that are being tackled by the research technical officers in Mandalay and *vice versa*?—That is so.

61354. You have four paddy stations, have you not, where you carry on experiments on improved varieties of rice?—Yes.

61355. Do you know what reputation exported Burma rice enjoys in foreign countries?—Yes, it is the rice in most demand. It supplies sixty-three per cent of the Western world's requirements.

61356. But the quality of Burma rice is considered to be inferior to that obtained from Siam and other countries?—Just as much as the quality of American cotton is less than the quality of Egyptian cotton. In any article of commerce satisfying the world demand, you have the supply split up into fractions differently priced.

61357. But the quality of Burma rice is inferior to the quality produced in Siam or any neighbouring countries?—I do not think that is the right way to put it. Burma rice is what one might call the "bread and butter" rice of the world's markets. It is the rice which ordinary people want and pay for. They do not want to pay for the other highly priced rices which are used for special purposes.

61358. Do you obtain from the cultivator a premium price for the seed that you sell?—We do not charge him any premium; we give it at the ordinary market rates and let him get the premium if he can.

61359. Among the various researches that you are carrying on, are you carrying out any researches into farm economics, that is, the cost of cultivation of, say, one acre of paddy?—Yes, that is always done at our farms for all crops.

61360. When you carry on experiments with manure you take the economic aspects into consideration?—Certainly.

61361. Is agricultural economics taught in Mandalay College?—We incorporate a short course in the three-year agricultural course; we teach them some elementary ideas.

61362. I see from your note that you carry on some researches into rotations. Could you tell us what rotation you have developed for Lower Burma as well as for Upper Burma?—We have not worked out any new rotations so far.

61363. What agricultural research problems with a special reference to Burmese needs require immediate attention? If you are given some money now and are asked to invest that money in agricultural research, to what would you apply that money at once? What is your urgent need?—That is rather a difficult question and I am afraid I must have time to think it out.

61364. You suggest, I think, that the Central Government should establish research stations in the Provinces. Supposing our Central Government wishes to start a central station in Burma, to what particular research problem would that central station devote itself?—It might be for the improvement of Burma cotton.

61365. That is being done, I understand, by the Indian Central Cotton Committee?—Yes, but they have got no place in Burma.

61366. Is it not working in Burma through you?—No.

61367. Can you think of any other problem which the Central Government might profitably take up in Burma?—I think I gave a list somewhere. I have not anything in mind just now. As a matter of fact, I think, in Burma, we are probably less dependent on the Central Government than most of the Indian Provinces are, because we are more or less isolated; we have got our own problems; our problem is rice, and we have also other problems subordinate to rice.

61368. *The Chairman:* Are any of your rice problems common to other Provinces in India?—Manure would be one.

61369. *Professor Gangulee:* Did you or any of your officers ever visit Coimbatore and see the work done there in regard to paddy?—Our Chemist was there, and I have been there myself years ago.

61370. You are in touch with that research station?—Yes.

61371. For some time to come the Mandalay Agricultural College is not likely to offer post-graduate training?—That is so.

61372. Would you like to develop Pusa as a post-graduate training centre for Indian students?—Yes; I think Pusa ought to be developed on those lines.

61373. Instead of sending our students abroad we might develop Pusa into an Imperial institution both for research and for post-graduate training. Do you envisage that?—Possibly.

61374. I think you have explained to us your idea about the central organisation, but I should like to ask you one or two questions about that. You said that the Central Agricultural Research Committee that you propose should meet at least once a year. Do you think meeting once a year would be enough?—I do not know; mine is only a tentative scheme;

the details will have to be thought out later on; you cannot foresee all these things at the beginning.

61375. I understand that, the Central Agricultural Research Committee would be a more or less advisory committee with no executive power; is that so?—I would give it the power of administering the fund; if a fund is established this committee should administer that fund just as the Indian Central Cotton Committee administers its fund. Only this is a committee comprising the whole activities of the department.

61376. You have known this Province for a pretty long time, I understand; could you tell us what definite improvement in the economic life of the cultivator you observe?—There is a very great difference now. I came in 1907; there was no groundnut in Burma then; now the acreage under groundnut is 500,000 acres.

61377. Better cultivation must be followed by better living; do you see signs of a better standard of living?—I think people must be better off than they were, unless they have grown less thrifty than they were.

61378. Has the crop yield gone down?—There is no sign that it has gone down.

61379. From the figures supplied to us, we find that the average yield of rice is 894 lb. per acre?—That is not my statement. The average yield per acre in Burma is 1,480 lb. of paddy. Do you mean 894 lb. of rice?

61380. Yes, rice?—That is probably too small.

61381. In your estimation, the yield is not decreasing?—It is not decreasing.

61382. You carried on soil surveys in four districts, did you not?—They were general agricultural surveys.

61383. Could you tell us what staff would be required to carry on soil surveys of the nature you carry on?—I think you are mistaking my surveys with the soil surveys now being carried on. The surveys I made in 1909-10 were general agricultural surveys, carried out in order to ascertain the agricultural practice, in detail, of the cultivators in each district. The surveys which are now being carried on are of a different type; they are surveys of soils, surveys of special crops, and so on.

61384. Have you carried on any soil surveys of the kind you speak of?—We have two soil surveys now going on.

61385. What staff have you engaged?—There is no special staff at all; it is done by the Agricultural Chemist as part of his duties.

61386. As part of his programme?—Yes.

61387. I think you have stated somewhere that the cost of collecting samples for Mandalay is Rs. 239-8-0?—Those were soil samples collected by the staff of the Deputy Director.

61388. Could you kindly give us the cost per acre of the soil survey of the nature you are carrying on now?—I cannot give the figure, it would be infinitesimal, because the number of acres is 1,000,000 in one of the districts.

61389. We are anxious to know what would be the cost of soil survey per acre?—I cannot give you the figure.

61390. You have made a reference to the agricultural improvement committees; these committees are statutory, are they not?—No; they are purely informal. I think the idea to begin with was that they should be statutory, but they are not.

61391. The recommendation was to give them a statutory basis?—But it was not accepted.

61392. Therefore, these committees are purely non-official committees?—They are informal, composed of officials and non-officials.

61393. Have these committees any funds at their disposal?—No funds.

61394. They are purely advisory?—Yes.

61395. What interest is taken by the district councils in agricultural matters?—None.

61396. Could you tell us the reason why the district councils are so backward in this matter?—I do not know.

61397. With regard to the Burma Village Act, you have told us in one of your notes that there is little doubt that in certain cases it operates adversely in the matter of agricultural development; could you develop that a little, and explain to us in what way you consider that the Burma Village Act reacts unfavourably on the agricultural situation?—The Burma Village Act enjoins that villagers should live in their villages; they are not allowed to leave their village and live on their holdings. The result is that many people have to cultivate land away from their village. But I may say that that Act is now a dead letter in this respect; there is a resolution of Government to the effect that the cultivators should not be interfered with if they wish to live on their holdings.

61398. *Mr. Kamat:* In your answers to our questions on two important heads in the Questionnaire, namely, Agricultural Indebtedness and Co-operation, I see you have not given us the benefit of any of your experience, and in reply to the Chairman you told the Commission that you had not applied your mind to the important question of agricultural indebtedness in this Province. As the question of agricultural indebtedness is a vital one in the rural welfare and the economic progress of the village community, may I know from you whether any other officer in your department has made a special study of that subject?—We have got the Co-operative Department in Burma, which deals with that.

61399. May I take it that you imagine that it is the special function of the Co-operative Department to study this question?—Yes.

61400. And that the Director of Agriculture and his Deputy Directors have no concern with the question of agricultural indebtedness or rural welfare?—Not at present. They may be interested, but they are not concerned with it, because they cannot do anything to relieve the indebtedness.

61401. You say they are not concerned, or they are concerned?—I say they are interested, but it is no part of any of their functions to do anything to relieve indebtedness.

61402. You think it is no part of their function to keep an eye on progressive development in the rural economy, the relation between the villager and the moneylender, his ups and downs in life, and things of that kind? They are not your immediate concern?—They are not our immediate concern, but we know about them.

61403. So also with reference to the important question of co-operation: Is it your idea that the Director of Agriculture is not immediately concerned with that side of the village life and the progress of the community?—Yes, because we have a Registrar of Co-operative Credit Societies, and a separate department, to deal with that.

61404. In this Province, are the Director of Agriculture and the Registrar of Co-operative Credit Societies working in watertight compartments?—Not exactly watertight; they are separate departments.

61405. What is the touch between you and the Registrar's Department?—We both work under the Financial Commissioner for Transferred Subjects.

61406. Are you closely acquainted with what the policy of his department is, and how it affects the agricultural improvements which you are making?—Not very closely.

61407. There again, you think, of course, that the two departments can run on parallel lines, without that close touch which some people imagine is necessary?—No. I think they want co-ordination.

61408. How do you hope to have that co-ordination which you think is desirable?—At present we are supposed to have co-ordination by working under the Financial Commissioner. He is the officer who is supposed to do the co-ordination.

61409. He is the connecting link, who is to bring about the co-ordination between the two departments?—Yes.

61410. Is not the Department of Agriculture as much a people's department as the Department of the Registrar of Co-operative Societies?—Yes, certainly.

61411. Do your Deputy Directors know the vernacular language well enough to know the minds of the people and their grievances?—Yes, they have got to pass the higher standard examination.

61412. Are they moving about, working themselves into very close touch with village life?—Yes.

61413. In one of your notes with reference to the correlation of departments, you have given us some of your observations as regards the office of Development Commissioner which you had in this Province. As this is perhaps the only Province in which this experiment of having a Development Commissioner for rural development has been tried, I would like to ask you a question or two on this point. Am I right in thinking that the Development Commissioner was working in order to bring about co-ordination for rural development between two or three departments?—Yes.

61414. But this experiment has now been given up, you say, because the object in view was not achieved?—I did not say that exactly. I said the name of the Development Commissioner had been changed to that of Financial Commissioner for Transferred Subjects.

61415. You say the correlation has been 'insufficient'?—Yes. I mean by that that there are other departments than Co-operation, Agriculture and Veterinary, which require to be co-ordinated, if rural betterment as a whole is aimed at.

61416. Precisely. But in the rural betterment as a whole, it was found in this Province that the Development Commissioner had no control over Education, or Public Health, or the Irrigation Department, all of which are intimately connected with rural development?—That is so.

61417. And this change of designation indicates, you say, that probably the object in view was not fully achieved?—Not completely.

61418. This co-ordination could not be achieved, because of the system which prevails, that is to say, because the Development Commissioner could not directly shape the policy, say, of the Department of Education?—Yes.

61419. Or communications?—Yes.

61420. That is to say, these two departments, affecting the villagers, were in the hands of two separate Ministers under the existing system, and as long as they remained under two or three different Ministers, one officer could not co-ordinate the activities and the policies of these two or three departments?—I do not say that.

61421. I am asking you if that is the diagnosis of the whole question?—No.

61422. Could you give me your view, then, as to why the co-ordination was insufficient, and the object in view was not achieved?—The co-ordination was supposed to be conducted by the Development Commissioner, but he had under him only Agriculture, Veterinary, and Co-operation. But you must co-ordinate Education and Public Health as well, if you are aiming at the complete rural betterment of the people. Bpt I do not see why that could not be achieved, even though these different departments are under different Ministers.

61423. You think, in certain circumstances, it could be achieved?—Yes. You could have a board of some sort, which would correlate. You could have the heads of these departments meeting on a board.

61424. Do I understand you then to say that, instead of a Development Commissioner, if there were to be a board sitting round a table, the object of co-ordination could be fully successful? Is that what you contemplate?—I think it might.

61425. In other words, the superimposition of one particular officer between the Director of Agriculture and the Minister was wrong, but if, instead of one individual being superimposed there was a board, then the object would have been achieved?—Yes. I think there would be more chance of achieving it.

61426. I do not for a moment suggest that there was anything wrong with the officer who was the Development Commissioner for the time being?—Nobody does.

I am asking you how the system worked.

61427. You have, in this Province, a vast amount of unoccupied but cultivable land?—Yes. I forget the figure, but I think it is about twenty million acres.

61428. I will give you the figures. There are about fifty-three million acres, of which about one-third is classified as culturable?—Yes.

61429. What, approximately, is the population of this Province?—It is thirteen millions.

61430. You have at least twenty million acres of unoccupied but cultivable land. Have the Government defined their policy in regard to bringing under cultivation all this vast area of unoccupied land?—No.

61431. No policy has been laid down?—It is classified as culturable, but it is really land which is on the margin of cultivation. A great deal of it is land which is flooded, or land which is covered with bamboo or scrub jungle. I think most of it would probably be unprofitable to work.

61432. Was there not a Colonisation Department, now converted into a Government Estates Department?—Yes. There was a Colonisation Department, which was a branch of the Co-operative Department. But that was not for colonising land of that sort; it was more for taking up land that has been classified as forest reserve.

61433. What is the specific object with which this new department has been started?—There were certain large areas of land round the south-west of Rangoon, which had been classified as forest reserves, but which had been deforested and which, on examination, were found fit for cultivation. I think the Registrar of Co-operative Societies, Mr. Dunn, whom you are examining, will be able to explain that more fully than I can; he is concerned with it.

61434. If there is an immense acreage of culturable land, and if you have not got sufficient population in the Province for its cultivation, in the interest of greater production of wealth is it not desirable that there should be some declared policy of Government in this matter?—I do not understand what policy we could have.

61435. Do they intend to hold this land in reserve like this indefinitely for all time to come?—Yes. A good deal of it is land which is just on the margin of cultivation. It is not profitable to cultivate it.

61436. Are you conversant with the history of agricultural relief measures taken in this Province during the last twenty-five years?—In what respect?

61437. I refer you to paragraph 6, page 17 of the provincial memorandum?—That is a note by Mr. Dunn.

61438. You are not quite conversant with this particular question?—I would rather that you asked Mr. Dunn about it.

61439. The labour in your rice fields in this Province is migratory labour. It comes chiefly from the Madras Presidency, and fluctuates during the year?—A certain amount of it comes from the Madras Presidency, but an increasing proportion of the labour is now being done by Burmese people from Upper Burma.

61440. Is that affecting your agricultural development, or is there no such effect?—I do not think there is any effect. They are landless labourers. They come and labour, get their wages, and then go back.

61441. Are the Burmese losing their lands in favour of Indians?—No.

61442. That is not so?—That opinion was held for a considerable time, but it was disproved by the last settlement of the Insein district, where it was shown that the number of Indians who held land was very small. There is no appreciable displacement of Burmese by Indians.

61443. They simply come as labourers, and then go back?—Yes, mostly.

61444. You have stated that you are against the Central Government making contributions to the Provinces?—Yes.

61445. You have quoted the analogy of the United States, and the Federal Government there helping research in the States in various ways?—Yes.

61446. In the United States, does the Federal Government give any grants to the States?—Yes, it does. But, so far as I know, I do not think the States contribute towards the Federal Government. In the Indian system each Province sends money to the Central Government.

61447. If you wish to apply the federal system here, why do you not wish to follow this particular item where the Federal Government gives grants to the States? Why are you against it here?—I do not quite see why the Provincial Governments should send money to the Government of India and that Government should send it back again.

61448. In what respect particularly do you wish to follow the American system?—In the system of having a Central Department of Agriculture, which will help the local departments by lending the services of its officers, or by opening stations.

61449. That is to say, you are in favour of the Government of India lending men, but not the money?—Yes, quite so.

61450. *The Chairman:* Apart from the provincial contributions which have been discontinued temporarily, according to the last budget, what contribution from this Province do the Government of India get?—They get a cess on the export of rice, which amounts to three annas a maund. The total cess is a little over a crore.

61451. *Mr. Kamat:* With a view to having a fund for research, you say you are in favour of an acre cess, but not a cess on exports. Do you contemplate a flat acre cess, or will it vary from acre to acre, according to the productivity of the crop?—I have told the Chairman that I would prefer to leave that to the financial experts. That is a matter which I have not worked out in so much detail. I think the total acreage cultivated in the Indian Empire is about two hundred million acres, and a very small cess per acre will give you a big sum of money.

61452. Apart from the financial intricacy of the question, you are at any rate aware of the broad fact, that an acre cess means provincial revenue?—Yes.

61453. How can an acre cess, if it is a provincial revenue, help the funds of the Central Government?—I do not quite follow your question.

61454. Supposing you levy, say, one anna per acre on your rice lands in the Province of Burma, how can those revenues be transferred to the Government of India funds if they are provincial land revenues?—I do not know; there is probably a technical difficulty there.

61455. And therefore, on this broad ground at any rate, an acre cess would not be a workable proposition?—If what you say is true, if it is impossible to transfer provincial funds in that way to the Central Government, it would not be.

61456. There is one more point in this connection. I think you are aware that land revenue assessments in this Province are fixed for twenty years; that is to say, so much assessment per acre is fixed for twenty years?—Yes, that is so.

61457. Or for some definite number of years at any rate?—Yes.

61458. They do not vary from year to year?—They are fixed during the term of the settlement which is twenty years or nearly twenty years.

61459. This cess, if now levied per acre, would be treated as a revenue assessment?—You are raising questions of detail into which I am afraid I have not gone. I think these are broad questions not for an expert in taxation but well known principles of revenue administration in every Province.

61460. *Mr. Calvert:* Did you not use the term "an acre cess"?—Yes.

61461. A cess is not land revenue, is it?—That is the whole point of course; if 'cess' means land revenue, I think there will be difficulties, but I do not think a cess will be land revenue.

61462. *Mr. Kamat:* You think this cess will not be treated as land revenue and will not interfere with the twelve or twenty years contract?—No, it would have nothing to do with it.

61463. Speaking of the prestige and quality of the work at Pusa, you said that the prestige and quality was better during the first fifteen years of the existence of Pusa. Am I to take it that you have at the back of your mind something like this, that this deterioration synchronises with the introduction of the Reforms?—Not at all; I said nothing to suggest that. I understand the staff at Pusa has been greatly reduced, the men have not the same chances that they used to have for research, and of course the prestige of Pusa has fallen, comparatively speaking, with the rise of the provincial department; that is of course natural.

61464. In any case, even supposing there were that suspicion in some quarters, Pusa is under the Central Government and has nothing to do with the question of Ministers, so that that objection I believe would not stand. You have suggested that the post of the Agricultural Adviser should be converted into that of a Secretary to Government?—I made that suggestion to emphasise the importance of the post; there are probably difficulties in the way of doing it, but that was my idea: to give him a certain amount of power.

61465. Has this officer, whoever he may be for the time being, been able to give sufficient attention to the Province of Burma? I am speaking impersonally?—I am afraid we have had very little connection in Burma with the Central Government.

61466. During the course of the last few years, how many visits could he give to Burma, compatible with the duties he had to perform in India?—I do not know; you had better ask Dr. Clouston I think.

61467. You have had no visit from him to your recollection?—No.

61468. We have also been told by another witness, as to whose statement I wish to have your view, that, owing to the long journey between India and Burma, if a research officer has to come all the way here, it takes something like ten days; the problem he comes to tackle may be found to be insoluble and he goes back rather disappointed; is that the usual experience? I mean you suffer from a great disadvantage in the distance from Pusa?—We are not much further away than the Punjab is from Calcutta; that journey takes about thirty-six hours.

61469. With regard to this post of Agricultural Adviser, you advocate that there should be two posts, that the present system of having, what I might call, this dual purpose officer should be dispensed with, and that there should be two separate posts: one of Director-General at Pusa and another of Agricultural Adviser, or whatever the designation may be?—Yes.

61470. If that arrangement were to be adopted, what precisely would remain as the duty of the Agricultural Adviser?—The Agricultural Adviser would be the administrative head of the whole department; the Director-General at Pusa would be a scientific head, a research head, a specialist officer.

61471. There is already a Secretary to Government in the Department of Education, Health and Lands; you propose that the Agricultural Adviser should be converted into a Secretary. I wonder how the two things are to be dovetailed into each other. You have not thought about it, have you?—No, I have not thought about it.

61472. Reverting to the question of district agricultural committees, about which you told Sir James MacKenna your views, they have been given the task of recommending to whom grants in aid for agricultural improvement should be given in this Province?—Yes.

61473. Has that duty been well performed by these committees?—Of course they have only just begun; they have only been in existence about two years. We have had a certain number of recommendations from one of them.

61474. Are these committees carrying on a sort of non-official propaganda creating a new enthusiasm and a new spirit of self-help among the population here, and working for the progress of the village community?—I cannot say that they are; I hope they will.

61475. I wonder whether you have heard of a semi-official or a semi-non-official arrangement in another Province called the taluka development association? I am speaking of the Bombay Presidency. You have not read of it?—Yes, I have heard about it.

61476. If you have heard about it, I wonder whether you have compared the two non-official agencies, namely, your improvement committees in the districts here and these taluka development associations in Bombay and, if so, whether you have compared them so as to decide which you would prefer?—Of course, you can hardly compare Bombay and Burma; they are two different Provinces; they are very far apart and dissimilar in conditions.

61477. In what particular respect do they differ so radically: in point of education, public spirit or prosperity?—Apparently there is a great deal of public spirit in Bombay, from the accounts I have read of these taluka development associations; I think there must be more there than in Burma.

61478. But if these agricultural improvement committees were subsidised by Government?—There is no subsidy by Government. Do you mean a money subsidy?

61479. I know at present you do not give them any grants, but suppose you began to give them and expected them to do more propaganda work to arouse among the people the spirit of self-help and progress, would that help? Have you got the material and have you got the men, non-officials, to do that sort of work?—Yes, I think we might find them.

61480. Speaking about your agricultural schools, there is one American Mission school which is being subsidised by Government and that school is giving instruction in agriculture?—That is so.

61481. Has that experiment been carried on for long enough to give you any idea how far this form of subsidised school would work?—No, it has only been in existence for about four years. As a matter of fact, the first batch of graduates left the school last year. I understand some of them have gone to agricultural callings; some have got jobs in rubber estates.

61482. When Government give a subsidy to a missionary school, do they stipulate that they shall have a voice in or some control over the policy of the school?—Yes, there is a Governing Committee on which a member of the Agricultural Department is the representative of Government, and a certificate is required to be given by the Director of Agriculture every year that the school is efficiently conducted before the annual recurring grant is given.

61483. Only a sort of efficiency certificate is required and beyond that the Government have no voice in suggesting the curriculum or the actual course of study which they wish to emphasise?—There is a representative on the Governing Body, a member of the Agricultural Department, and to that extent Government has a voice.

61484. Being the nominee of Government, he can tell the committee exactly what Government require?—Yes.

61485. You have an Agricultural Engineer in this Province —Yes.

61486. So far as the designing of agricultural implements goes, he has designed a ploughshare?—Strictly speaking, that was designed by one of the Deputy Directors, Mr. Hendry; but the Agricultural Engineer helped in it; he collaborated.

61487. Could you tell me whether the Agricultural Engineer has designed anything else in the matter of agricultural implements?—Yes, he designed a windmill and a water-lift, a new type of jaggery furnace, and several other minor things.

61488. When the Engineer gives out new designs, what machinery have you in this Province for the manufacture of implements according to that design?—We have no such machinery.

61489. There is no private enterprise, no workshop where things could be turned out to the design of the Agricultural Engineer?—Yes, this ploughshare which was designed by the department is being made by various Burmese people throughout the district, being cast by them.

61490. Then why do you say that certain kinds of ploughshares are being shipped from England to Burma in large numbers?—Of course we did not patent the ploughshare and there is one firm in Rangoon which for many years has been importing the old type of ploughshare; that firm got hold of this new type and is getting it imported now.

61491. Is the Agricultural Engineer or your department encouraging or stimulating private enterprise with a view to getting these ploughshares manufactured locally on the spot?—Yes, he is.

61492. What help do you give?—He has got a Burman working at his workshop in Mandalay, making these ploughshares on contract.

61493. Speaking about deterioration in the soil, you told the Commission that there is no appreciable deterioration. Have you got figures of yield spread over a period of thirty or forty or fifty years?—We have got figures for the total production of rice in the Province and the figures for acreage. I supplied the figures to the Commission. You will find them somewhere in the notes.

61494. Speaking from memory, have you got any clear idea as to what the yield per acre was forty years ago? Is that yield still substantially maintained without any manure?—We have got settlement reports. I quoted them in the note which I sent. The settlement report for the Hanthawaddy district compiled about 1870 gives yields of paddy which are very similar to the yields given now. As a matter of fact, the yields of first-class land in the latest settlement report of 1913 are higher than the yields given for first-class lands in the settlement report of the seventies.

61495. With regard to well-digging and irrigation by wells, you think there is good scope in certain tracts of Burma for people to dig wells and put in the necessary plant for the lifting of water?—I could not answer that question without having a survey made of the possibilities.

61496. So far, no attention has been paid to the possibility of well-digging and water-lifting?—As I explained before, the problem is difficult. The part of the country where water is required is very undulating country, not very suitable for well irrigation. I do not mean to say that you cannot have well irrigation in certain parts of the Province; there are large parts of the country which are most in need of water where it will be very difficult to apply it.

61497. In reply to one of my colleagues, you referred to the operation of the Burma Village Act. You said there were certain difficulties owing to which people cannot spread out and build homesteads. You said that is chiefly because there is violent crime in the Province. Is that one of the reasons why people are not inclined to go in for a system of homesteads and farmsteads?—That is one of the reasons given by Government for keeping them in the villages. If you have a number of scattered huts all over the country, the criminals resort to these to carry on their depredations, but of course it is obvious that if all the people in the country left the villages and went into homesteads that argument would no longer hold.

61498. Speaking about subsidiary industries, you mention that certain agricultural industries have grown up during the last few years in Burma, without the aid of Government. Do you think there is no scope for the encouragement of any further industries on the part of the Government?—I think it is better that industries should grow up without the aid of Government.

61499. These industries have perhaps been paying and people have found it profitable to go in for them, but besides these are there any subsidiary industries which Government could encourage by giving demonstrations, or by other methods?—Are you referring to industries in general?

61500. I am referring to agricultural industries?—Agriculture is the basis of many industries that might be mentioned.

61501. To mention one: You have oil-pressing here. What are the subsidiary industries based on that?—One of the most obvious is soap-making. We have it here in Rangoon.

61502. To quote another instance: Supposing there is groundnut here or other oil-seeds, have Government thought out whether it is feasible to take up the question of manufacturing vegetable *ghi* or margarine and things like that?—Not that I know of. The Burmese people do not use *ghi;* they use sesamum oil.

61503. Take the question of fruit-canning and fruit-preservation: You said you have abundant fruit. Has anything been done by Government

to indicate the direction in which people could take up the industry of fruit-canning?—I have got that in mind but nothing has been done so far. There is no reason why we should not do it here as well as in the Straits.

61504. In answer to one of our questions you have said, with reference to the expenditure incurred by agriculturists, that thrift is a virtue which does not find a place of honour among the people in the East. Will you amplify that and say what exactly you have in your mind?—I was thinking particularly of the people in this Province. The Burmans are an extraordinarily generous people. They are given much more to spending than to saving.

61505. Do you mean that they spend beyond their earnings, or that they are hospitable but spend within their means?—They spend within their means. I should say that they are fond of spending all they have got to spend. They are not given so much to saving money. They do not have large bank accounts as people in the West have.

61506. If they spend within their means, whatever they may be spending on religious or social usages would not be the cause of their indebtedness?—You cannot spend on two things at the same time.

61507. Please follow me. You said that they spend within their means?—I only meant to say that they are given to spending, probably more on religion and social matters, and give little thought to saving money.

61508. That is a different matter. Some people may spend on clothes and some people may spend on religious usages. As long as they spend within their means, that would not be the cause of indebtedness?—If you are going to get rich you must see that you save capital.

61509. I will give you an instance: Women in the West may spend perhaps on a dozen pairs of silk stockings and women in the East or in Burma may spend perhaps on religious usages or customs. But as long as they spend within their means, that would not involve them in indebtedness?—I will give in to you on that point.

61510. *The Chairman:* To take that matter a stage further: Where the same person has an opportunity of improving his land, if he can collect the capital for that improvement by thrift it is better that he should do so than that he should borrow money on long-term mortgages for the improvement of the land?—That was the point I was making.

61511. *U Ba Cho:* I want to ask you about the status of the Agricultural College at Mandalay. The College has not been affiliated to the University of Rangoon?—That is so.

61512. When the College was started the idea was to affiliate it to the University of Rangoon?—Yes.

61513. You know that the MacKenna Committee strongly recommended it?—Yes.

61514. What are the difficulties involved in affiliating the College to the University?—We could get affiliation to-morrow if we agreed to have a four-year course but we do not want to have a four-year course because it throws far too much work on the staff in the matter of teaching elementary science. There would be no time for research. We have decided that if we have affiliation we must have a two-year course only. We must get entrants who have passed the Intermediate Science examination of the Rangoon University. We cannot get these men. They will not come to us because, after completing the further two years which would be necessary for the degree of B.Sc., which we propose to give, we would only be able to offer them the pay of the Subordinate Service, that is to say, Rs. 150 to Rs. 300. I.Sc. candidates could get a scholarship for two years in the Forestry Department of the Rangoon University and be appointed on graduation to the Provincial Forest Service on Rs. 300 to Rs. 800. Or they can get into the Civil Service on somewhat similar pay. That is our difficulty. The difficulty is that the demand for educated Burmese youths is at present greater than the supply, and our department is not able to offer them sufficiently high pay and has got to be content with people of a lower standard of education. If,

however, we agree to take in the High School final, that is to say, the matriculation candidates, and make the staff of the College go through all the work and drudgery of a four-year course by teaching elementary science, of course we could get affiliation to-morrow. At present there is no particular point in it. I do not think the affiliation would affect the status of the students much.

61515. Apart from the school at Pyinmana, we have no agricultural school in the Province?—That is so.

61516. What are your views on the subject of teaching agricultural subjects to the sons of the cultivators?—The difficulty is this. The sons of the ordinary cultivator never get beyond the *Pongyi* schools or monastery schools. There is no use in teaching agricultural subjects in the middle schools if the boys who leave these schools are not going to be cultivators at all and are going to become traders, clerks or Government servants. So it will not be much use teaching agriculture in these schools.

61517. You would not even recommend that agricultural subjects should be taught in ordinary middle or primary schools?—I have no objection to agriculture being taught for its educational value. In fact, I am in favour of it because many of the town-bred boys going into the Civil Service have no idea whatever about agriculture, but I do not think that teaching of that kind would have the slightest vocational value.

61518. Even in rural areas?—The same argument that I brought forward previously applies in the present case also, namely, that these boys would not go back to the land. If you teach them it must be for its educational value, and it has a certain amount of educational value.

61519. In answer to questions put by one of our colleagues about communications, you said something to the effect that communications in Burma are not so badly wanted? Are you aware that roads are a crying need in Burma?—I agree with you.

61520. And by having more roads the price of the produce from the areas under cultivation will be raised?—I am not so sure about that. In any case you require roads for the convenience of getting out your produce.

61521. Would you not admit that easy and cheap transport would secure to the cultivator a higher return for his produce?—Yes, in far-away parts.

61522. The areas now inaccessible would be brought under cultivation if we had communications opened out to them? In the Shan States, for example, if we had good communications considerable areas there could be brought under cultivation?—Yes, I gave the potato cultivation in the Shan States as an example.

61523. Now with regard to culturable waste, most of this could be cultivated with profit if only the people would try?—Not from what I have seen of the so-called culturable waste lands. Most of what I have seen is land on the margin of cultivation.

61524. Do you mean all the culturable land mentioned in your report?—I do not say all, but I should think a great deal of it is.

61525. Do you know that, as a matter of fact, every year these culturable waste lands have been brought under cultivation?—Where?

61526. All over the Province, especially in the Lower Province?—The nature of the culturable waste differs from district to district. I understand it is left to the discretion of the Settlement Officer to declare which land is culturable and which is not culturable when a settlement is being done.

61527. In other words, the area cultivated by the people has been increasing for the last ten years at least?—Yes, but at a very diminishing rate. The rate of increase is diminishing now. All the main areas suitable for paddy cultivation have been brought under cultivation.

61528. With reference to the Government estates, are you in favour of Government stepping into the place of landholders and letting out the land themselves to tenants?—I have not been consulted in the matter and cannot, therefore, answer that question. I know nothing about it.

61529. *Dr. Hyder:* Have you got many varieties of rice in your Province?—Yes, a great many.

61530. Have you got any varieties specially suitable for the areas in which floods occur?—Yes.

61531. So that the people living in those areas do not lose their crops?—We have got flood-resisting paddies in Burma. You will see some of them at Hmawbi. They are not yet suitable for distribution, and they are paddies of very low quality.

61532. Have you got any cinchona plantations in the Province?—Yes; they are run by the Government of India.

61533. Have you had any difficulty as regards your budget at the time of voting? Have your budgets been cut very considerably?—No, there have been the usual small cuts which every department has got to put up with; otherwise we have had more or less all we wanted.

61534. *Sir Thomas Middleton:* In the provincial memorandum you set out the numbers of livestock in the Province (page 4). Is it your impression that these figures are trustworthy?—I really cannot say; these figures are obtained by annual census through the Deputy Commissioners of the districts. I have examined them carefully quite recently and they seem to be fairly consistent, so far as each individual district is concerned. I mean to say that a district which has a large number of working bullocks in one year shows a large number in the next year.

61535. Take the cattle class, for example: "Young stock", in the definition adopted in the Government of India statistics, consists of animals not fit for work or breeding. They would include animals up to about three or four years old?—That is quite correct.

61536. That being so, what are these 637,000 bulls? There is one bull for every two cows?—I do not know; these figures have simply been taken from the Season and Crop Report.

61537. *Mr. Reynolds:* They do not castrate them till they are four or five years old?—Possibly that is one explanation.

61538. *Sir Thomas Middleton:* A great deal has been said about the prestige of Pusa. Is it not after all a question of relativity? Pusa was originally the one star in Indian research; others have risen since, and as the others have come into existence the light from Pusa has not travelled so far?—That is so.

61539. Does not that explain a great deal of the criticism?—Possibly that is a large part of the explanation.

61540. *The Chairman:* Is it your opinion that Deputy Commissioners in the districts take that interest in agricultural improvement and in the welfare of the rural population which it is very necessary that they should take?—That varies from district to district and from individual to individual. Some Deputy Commissioners take a great deal of interest in agriculture, others do not take quite so much interest.

61541. Have you found it of very great help from the agricultural point of view when the Deputy Commissioner does take an active interest?—Yes; the Deputy Commissioner can do a lot.

61542. In backing up the Agricultural Department?—And in getting advances for the purchase of seed and that sort of thing.

61543. Is it your impression that the legislature in this Province is sympathetic towards agricultural improvement?—I should say that it is not unsympathetic. We meet with a great deal of criticism.

61544. What exactly does that double negative mean? Does it mean that you do meet with criticism?—We do meet with criticism but so far we have been given the cash.

61545. You and I come from the same country?—Yes.

61546. Do you really mind the criticism if you get the cash?—No.

61547. You see no reaction in the mofussil as a result of the discussions on agricultural subjects in the legislature?—I cannot say that I do.

(The witness withdrew.)

Mr. D. HENDRY, M.C., Deputy Director of Agriculture, Southern Circle, Rangoon.

Replies to the Questionnaire.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(*a*)

(1) Demonstrations in cultivators' own fields near villages and roads.

(2) Exhibits, demonstrations, and lectures at district annual agricultural and co-operative conferences.

(3) Lectures by District Assistants to cultivators in their own villages.

QUESTION 10.—FERTILISERS.—(*a*) Yes.

Cattle manure is not so carefully collected and stored as it should be and the augmentation of this form of manure by composting it with vegetable rubbish is not practised. By the use of cheaply covered pits the quantity and value of this manure could be increased, and Agricultural Assistants advise this when touring in their district.

Other indigenous manures such as bats' guano and fish manure are already used for special crops in garden cultivation and are too expensive for paddy.

Hitherto, the use of artificial manures has not left a sufficient margin of profit on paddy.

Cheaper artificial manures are now becoming available and with the price of paddy in the neighbourhood of Rs. 175 per 100 baskets at harvest time the use of artificial manures will become a paying proposition. Ammonium phosphate appears to be the most promising manure and the following figures indicate its cheapness compared with ammonium sulphate and superphosphate, which have hitherto been the best manures supplying the required constituent:

	Price per ton (Rangoon).	Analysis.		Unit price in Rupees.	
		N.	P_2O_5.	N.	P_2O_5.
	Rs.				
Ammonium sulphate	208	20	..	10·4	..
Superphosphate	113	..	20	..	5·65
Ammo-phos 20/20 .. .	220	16·48	20	8·97	4 39
Ammo-phos 15/48 .	245	10·7	48	6·66	3·62

Experiments with ammo-phos have shown a profitable return on paddy and if these results are confirmed by experimental plots which have now been put down in the districts, a programme of demonstration will be prepared and carried out.

From the experiments already carried out there are indications that the yield of paddy can be increased by from thirty to forty per cent divided over two years and leave a profit of about eight to ten rupees per acre. The results will vary a good deal on different soils.

(*b*) Legislation similar to that existing in the United Kingdom could be introduced to deal with fraudulent adulteration of fertilisers when these come into common use. District Agricultural Assistants could be empowered to take samples for analysis and the samples analysed by the Agricultural Chemist whose staff should be reinforced for the extra work.

(*c*) Field demonstrations carried out on cultivators' land village by village would be the best way to popularise the use of profitable fertilisers.

To begin with, the Agricultural Department would have to keep a small stock of fertiliser in each district until a trade could be built up. The issue of supplies on credit to be paid for after harvest would be very effective but such a method could only be used to a very limited extent.

A secure knowledge that compensation for the unexhausted effect of the manure would be paid to a tenant turned out of his holding would stimulate the use of manure.

(*e*) The investigation of the effect of manuring with phosphate nitrates, sulphate of ammonia and potash manures in paddy land in Lower Burma has shown that while nitrates are definitely injurious, phosphate and nitrogen can be relied upon to increase the yield considerably; but that hitherto the use of such manures has not left a sufficient margin of profit. Potash is also beneficial but the need for potash is less than for phosphate and nitrogen. With the prospect of artificial manuring becoming practicable, other problems will arise and further investigation is being undertaken.

The investigation of the effect of manuring of crops other than rice in Lower Burma has not yet been undertaken. Compared with rice such crops are comparatively unimportant and facilities for such investigation have not been available.

QUESTION 11—CROPS.—(*a*) (*i*) The improvement of crops is already undertaken by the experimental stations in each agricultural circle and this arrangement works quite well. In Lower Burma rice is of paramount importance, being practically the only crop grown on an agricultural scale, and systematic improvement of this crop only has been attempted. Satisfactory progress has been made and the work of improvement is still being continued.

After rice occupying over ninety per cent of the cultivated area in Lower Burma, mixed gardens occupying about three-and-a-half per cent are next in importance, and improvement work on garden crops is being undertaken on land acquired within recent years.

While the improvement of rice can probably best be carried out by working on the varieties already in the country the stimulation of fruit-growing can probably be best brought about by the importation of better sorts from other countries and testing their suitability for local conditions.

(*ii*) There is no prospect of introducing any new crop to compete with paddy on swamp soils in Lower Burma. On the ridge land, fruit and vegetable might be better cultivated but most of the varieties of fruit and vegetables which will grow are already cultivated to some extent.

The cultivation of fodder crops in Lower Burma presents many difficulties. Paddy land (*i.e.*, ninety per cent of the cultivated area) will not grow any fodder crop known to us during the rains; the soil dries up with great rapidity, and in its hard dry condition is unsuitable for growing any crop. Cultivation of land while still wet at the end of the rains accelerates the drying process and seeds of leguminous crops sown among the paddy have invariably failed. Paddy land kept moist by seepage from surrounding hills, or land near and below the level of adjacent rivers can be used for growing other crops, but such areas are very small and are used for vegetable cultivation.

Guinea grass, Merker grass, fodder cane, Kikuyu, etc., have been introduced for cultivation on ridge garden land but are not grown to any extent.

(*iii*) The distribution of seeds is most effectively carried out by the Agricultural Department and private agencies can hardly be said to exist.

To keep down transportation costs improved seed is best grown in the district where it is to be distributed, and a number of seed farms under department control are necessary for this purpose. A number of such farms have been started recently and more will be opened as staff becomes available.

The distribution of seed may be considered to be expanding in a normal and satisfactory manner.

(*c*) The efforts made to improve rice may be considered successful in so far as new varieties have been produced which give an increased yield of twelve to fifteen per cent and command a premium for quality averaging about six per cent.

Oral Evidence.

61548. *The Chairman:* Mr. Hendry, you are Deputy Director of the Southern Circle?—Yes.

61549. In answer to our question about fertilisers you make certain statements about the value of ammonium phosphate and you give us some indication of the experiments on which you found your views. Are you satisfied that these matters have been carried through with sufficient thoroughness to give a reasonably accurate indication?—So far as they have gone they have been carried through with a fair amount of thoroughness.

61550. Is it your view that further experiments in fertilisers ought to be carried out?—I think we have a fairly general idea from the actual experiments carried out with the Lower Burma paddy soils of what the manurial requirements of these soils are. The use of manures is a matter of cost and cheaper manures are now coming into the market.

61551. How about fertilisers for the middle dry tract?—I am not familiar with the middle dry tract at all. I have always been in Lower Burma.

61552. One point as to marketing: I put the question to the Director and you probably could not hear his answer. It emerges from the mass of material on marketing which is before the Commission as far as this Province is concerned, and that is, that there is much unevenness in practice?—Yes.

61553. Would you agree that, in the main, the unevenness and irregularity are to the detriment of the small and the humble man, in other words to the detriment of the cultivator and to the advantage of the buyer?—I think so.

61554. Would you agree that, in the main, there appears to be no public demand amongst cultivators for any improvement in the method of marketing?—Well, the ordinary cultivator is always keen, of course, to get a better price for his produce, but he has not responded to efforts which have been made to organise the selling of his crop by better methods.

61555. Would you agree to this broad proposition, that improvement in marketing and improvement in the capacity of the cultivator to look after his own interests, is more likely to spring from the spread of primary education and literacy than from any other source?—I think so.

61556. *The Raja of Parlakimedi:* You say, in reply to Question 10, that legislation similar to that existing in the United Kingdom could be introduced to deal with fraudulent fertilisers when these come into common use. Is it because of the contaminated condition of the fertilisers that are available that the cultivators are not willing to apply them?—No; they do not know them; there is no trade in fertilisers at present.

61557. It has been suggested to the Commission that in certain tracts the land will not in future produce the same amount as in the past, without application of manure; is that known to the cultivator?—I do not think the cultivators as a whole realise the necessity of manuring. At the present time, to a certain extent some do; but the way in which cattle manure is wasted seems to indicate that they are not fully aware of the value of such a valuable manure even as cattle manure. It is quite common to see cattle manure thrown into the creeks as a nuisance.

61558. Is the department taking sufficient interest in educating the cultivators to a sense of the usefulness of applying a sufficient quantity of manure?—Yes; all district assistants have definite instructions to stop, wherever possible, this waste and introduce better method of storing cattle manure.

61559. Are they convinced of the benefits that they could derive by following your advice?—It is difficult to know whether they are or not, but they do not seem to be, judging by their practice.

61560. Do you think that demonstration in that line has been carried out sufficiently?—No. We have not had sufficient staff hitherto.

61561. As regards seed supply, you state that effective measures have been adopted?—Effective measures have been adopted; we are beginning to carry out seed distribution on a large scale.

61562. But would you not like to see it done on a larger scale?—We have, just at present, as much as we can do; if the present methods prove effective we might go further.

61563. Can you give us an idea as to how many seed-distributing farms you would like to locate in a taluka?—I would like to have one every ten miles. (*Showing a map.*) This map shows the location of seed farms in my own circle at present.

61564. How many have you per district?—There are thirty-two in five districts; that gives about six per district.

61565. And how many more would you like to have?—I have not worked it out in detail, but the number will have to be increased largely. The number of seed farms has been determined by the grazing grounds that have been available; we have not bought the land.

61566. Are you concentrating your attention (in the matter of distribution of seeds) on the improvement of quality or on the increase in quantity?—Both quality and quantity are kept in view.

61567. Have you got hybridised varieties?—All the paddies under distribution have been selected by pure line selection, but steps are being taken at the present time to improve them by hybridisation.

61568. Have you carried out sufficient soil analyses to be able to suggest what grain will suit a particular area?—We have made surveys of the soils in the central farm. In my circle a soil survey was commenced in the Pegu district but has not been quite completed owing to lack of staff. A large number of soil samples were collected (I myself collected most of them), but the Agricultural Chemist has no staff to collect the remaining samples and my own staff is now more fully employed on other work.

61569. Have you been approached by private people to have an analysis of their soils?—Occasionally we have requests for soil analyses.

61570. Are you attempting, in any way, to educate the public on these matters when you go on tour? Do you tell them that these things are necessary if they want to increase their yield?—The district staff tour on an average for twenty days in the month; and I myself tour on an average twenty days per month, and when we are in the fields we discuss these matters with the cultivator.

61571. Do you spend twenty days on tour every month, or do you go on tour only during certain seasons of the year?—It is an average of twenty days per month throughout the year; during some months I tour less; sometimes I tour during the whole month.

61572. Have you received any help from co-operative societies in getting into touch with the cultivators?—We have tried that with varying success. We tried to get the co-operative societies to open seed farms, but we have met with very little success.

61573. *The Chairman:* Through credit societies?—Yes; credit societies.

61574. *The Raja of Parlakimedi:* Did you say that they have not been taking very much interest?—They have not yet established seed farms which are actually distributing seeds.

61575. Are they interesting themselves in the distribution of manures?—Manures have not yet reached the distributing stage.

61576. In Madras we have agricultural associations run by co-operative societies; do you have any of that sort here?—No.

61577. Are you in charge of the cattle-breeding station?—No; the only experimental farm with which I am connected is devoted almost entirely to rice.

61578. You have seen the local conditions. Do you think work on the lines in which cattle-breeding is now encouraged will succeed in getting the cultivator to take up cattle-breeding?—There is practically no cattle-breeding in Lower Burma. The cattle that are used here for draught purposes are brought in from the dry zone.

61579. Supposing suitable breeds of cattle are made available for crossing with the indigenous varieties, do you think they will interest themselves in the problem?—So far as Lower Burma is concerned, the limiting condition is climatic; there is no cattle-breeding on a big scale in Lower Burma;

the cattle that are used here for draught purposes are brought in from the dry zone.

61580. But if the people take it up, do you think it will become a success?—Not in Lower Burma.

61581. Because of the want of grazing grounds?—On account of the lack of dry land to keep the young stock; the greater part of the land is under swamp conditions during half the year.

61582. But Central Burma is superior in that respect?—Yes.

61583. Are the cultivators in the habit of setting apart a portion of their holdings for grazing?—Not in Lower Burma.

61584. Let us take Upper Burma?—I am not familiar with the conditions in Upper Burma.

61585. *Sir James Mackenna:* How many varieties of paddy are now under study?—There are several hundred varieties under study, but the actual number under distribution is seven.

61586. What premium do the millers give you for your improved paddy? Do you subject your varieties to the mill test?—We subject them to the hulling test, which is not the same as the mill test, but it gives useful comparative figures. The millers are keen on getting our improved paddy, but it is difficult to get it to the market pure; they are mixed before they get there.

61587. What is the remedy?—Extensive seed distribution seems to be the only way out of the present difficulty. By steadily increasing the area under improved seed, adulteration of good with impure paddy will gradually decline.

61588. What is the actual premium?—Premiums are almost always paid for paddy which is sufficiently pure.

61589. Approximately pure?—Yes. As a matter of fact in my circle there are over a hundred mills; in almost all the mills they have got a placard at the gate stating that a premium of ten rupees or so per hundred baskets will be paid for paddy grown from the Agricultural Department seed.

61590. What about the question of red rice?—Red rice is present in proportions of five to twenty-five per cent in unimproved Burma rice, but it is quite easy to eliminate it by pure line selection. All red rices are also found chiefly among the deep water varieties but white selected varieties of this type are also now available at Hmawbi.

61591. But when the pure seed goes out of the cultivators' hands it is liable to be mixed again. Is the position distinctly better than it was some years ago?—Distinctly better. I have figures from small mills near seed farms which have been in operation for the past ten years. The percentage of red rice has been reduced from twenty-five to seven or eight and the outturn of white rice from paddy has risen from forty-one to forty-three per cent.

61592. *The Raja of Parlakimedi:* Are you working for long-period varieties or short-period varieties?—We have a complete gradation from 120 days to 190 days in life period, to suit different conditions.

61593. What is the shortest?—The shortest which produces a reasonable crop is 120 days. It is called a Japanese paddy, but it really comes from Formosa.

61594. What is the yield per acre?—The yield of course varies with the land, but this paddy is capable of yielding from forty to fifty baskets per acre on first-class land, and twenty to twenty-five baskets on third-class land.

61595. What is the poorest variety?—The particular variety which I have just mentioned is a coarse variety, and it has inferior rice. It is not a Burma variety at all, but it is a true tropical variety and grows well here.

61596. Is it eaten largely by cultivators?—It is eaten by the cultivators in the same way as other rices grown in Burma are eaten, but it is not grown on a large scale.

61597. *Professor Gangulee:* Is the premium offered by the mills known to the cultivators or only to the brokers?—It is known both to the cultivators and to the brokers. When the cultivator goes to a small village mill he will see a placard there to the effect that a premium is offered for improved paddy; it is written in Burmese, and the cultivator can read it. They are offered a premium of five to ten rupees per hundred baskets.

61598. On what criteria is the premium given?—Evenness of grain and absence of red rice.

61599. You think this practice of offering a premium has the effect of increasing the adulteration of paddy?—There was a case of that last year. Mr. Edwards, who is going to give evidence before you later on, will be able to tell you about it. He offered a high premium of, I think, thirty rupees per hundred baskets for our No. 10 where such paddy is grown to a considerable extent; and the cultivators or traders adulterated it, whereby the paddy lost the value which it had had previously.

61600. Judging from the literature that we have before us, it seems to me that at the present time your department is chiefly concerned with the distribution of paddy seed?—That is one of the main planks in our platform. In Lower Burma, paddy occupies over ninety per cent of the cultivated area and an improvement in the standard of this crop is of the first importance.

61601. Do you see any hope of private agencies coming forward to undertake this distribution?—There has been no evidence of it so far.

61602. That puzzles me. You have 200,000 acres under improved varieties?—Approximately.

61603. And to supply the seed for that area ought to be a profitable concern for private agencies. Can you explain to us why such agencies are not coming forward in Burma?—It may possibly be a question of finance. Very often, in the distribution of seed, it is necessary to advance the seed and take payment after the following harvest.

61604. It is not really the function of a Government department to go on distributing seed. The Government department is chiefly concerned with evolving new types, experimenting with them. Afterwards, being sure of their success, it should hand them over to commerce?—We should be very glad to do so.

61605. How is it that such private agencies are not to be found here?—I cannot say.

61606. You have, I understand, five central seed farms, and you propose to have five more?—Altogether, there are eight central farms, and five subsidiary farms.

61607. How do you maintain the purity of your stock on the central farms?—On the central farms we do so by single plant selection each year. Finally it reaches the farm multiplication area. In the districts, you can only hope to maintain the purity of the seed by re-distribution at intervals of three or four years.

61608. That is for the farms under your supervision. What about the farms controlled by private agencies?—The private seed farms in my circle are not very satisfactory; it is difficult to maintain the purity of the seed there; but with the progressive spread of pure seed from our controlled farms adulteration will gradually diminish.

61609. In seeking a new variety, what chief qualities do you look for?—We look for yield and milling quality.

61610. What is the quality the trade gives preference to?—The trade likes what we call in Burma Ngasein rice for export to Western markets.

61611. You concentrate on satisfying the trade demand?—Yes, and that coincides with the cultivators' demand; for the type which is exported is also that which is used for home consumption.

61612. Will you tell the Commission the present position of Burma rice as regards quality? We have heard a lot of criticism about it. We want to know from you what you think of the position of Burma rice in this respect?—The medium quality Burma rice is not so inferior as is sometimes

sought to be made out. It is much superior to the rice grown in Indo-China, and fetches a higher price even at the present time. The policy with regard to rice improvement in Burma is based upon evidence collected before the Indian Trade Enquiry, the report of which was published in 1920. Some of the replies received from the rice trade were forwarded to us by the Imperial Institute. The Imperial Institute informed this department that "the firms consulted appear to agree that a change in the type of the bulk of the rice exported from Burma is not desirable, as this type has a very wide market and is always saleable": and that "it would seem desirable to retain the common types of rice now produced in Burma for the bulk of the exports and for the Agricultural Department to distribute improved strains of these types."

The opinions of some of the firms on which this conclusion was arrived at, can be cited (1) "We do not consider that the rice produced in Burma is of a coarse quality. When treated and polished by rice millers in Europe, it gives a beautiful rice, although from the point of market requirement, it does not command the same price as Carolina and Java varieties. Burma rice, owing to its cheapness and the quantities available, forms the basis of the rice trade of the world. If Burma went in for fancy varieties, then we believe that the volume of trade in Burma rice would decline, simply because traders on this side would not be able to handle large quantities. Also, the large demand for Burma rice in the East would probably be diverted to some other rice-producing country, say, Saigon or Siam"; (2) "Burma rice, when well milled, is all that is required for everyday use, and is cheaper than Java and Carolina varieties"; (3) "We cannot recommend such an undertaking as changing the quality of rice grown in Burma"; (4) "We do not consider a change in type is desired by importers in the United Kingdom as the export trade is more important than the home trade, and for export the ordinary round Burmese rice, Rangoon quality, Saigon rice, and Siam rice are the kinds required."

61613. So, Burma has no fear of competition from other countries with regard to the quality of rice?—Burma provides over fifty per cent of the rice which goes into international trade, and the amount exported has increased steadily in recent years.

61614. I think the Director of Agriculture informed us that the limit of expansion of the cultivated area has been reached. If that is the case, do you think you will be able to maintain the supply?—The amount of rice exported from Burma in recent years has increased steadily, and if manuring becomes general, there is no doubt about a definite further increase, being possible.

61615. You will have to go in for intensive cultivation?—Cultivation has to become intensive instead of extensive, as it is at present.

61616. There comes the need of further research on manuring?—Yes.

61617. I think you stated that you were going in for hybridisation?—Yes.

61618. Is that work under an expert?—It is being done by me.

61619. Have you any other crop expert besides yourself?—No. On the Hmawbi Farm there is the subordinate staff, but the man with longest service has been there for only four-and-a-half years and he has only been on the plant-breeding side for two years.

61620. There was a proposal to appoint special crop experts?—I believe there was a proposal in 1919 to appoint a special Botanist for rice improvement, but that was not done.

61621. Who opposed the proposal?—I cannot say.

61622. I see that you attach a great deal of importance to demonstration on the cultivators' own fields. Under that system, what guarantee would you give to the cultivator? Would you give him any guarantee at all?—A guarantee is implied, but no specific guarantee is given. The demonstrations of new varieties are expected to be successful, and there have been no cases of failure to report at all.

61623. You attach great importance to exhibitions, demonstrations, and so on. I think that was one of the functions of the agricultural improvement committees suggested by the MacKenna Committee of 1925?—Yes.

61624. One of the functions I see here is that they should arrange for holding shows, exhibitions, etc., in the districts, and for this purpose they should be eligible to receive some grant from the Government?—Yes.

61625. Do you know whether that has been done?—There are given every year small grants of about Rs. 100 for each show, to be spent on prizes for improved agricultural produce.

61626. Is that in your circle?—Yes.

61627. Is there an agricultural improvement committee there?—There is no agricultural improvement committee, but shows are organised each year by the district co-operative and agricultural associations, and small grants of about Rs. 100 to Rs. 150 are given as prizes for improved agricultural produce.

61628. In your circle, there is no sugarcane?—The sugarcane in my circle is less than 2,000 acres, which is negligible.

61629. What prospects are there for extensive sugarcane cultivation in Burma?—The Sugar Committee stated that the prospects for sugarcane were better in Burma than in any other Province in India. That was for the middle dry zone.

61630. Is the variety grown J-213?—The J-213 variety grows in Lower Burma, but it is liable to mosaic disease; a better variety for Lower Burma is B-3412, which grows very well, and is better suited for chewing than J-213.

61631. Who is in charge of your sugarcane work?—The Horticulturist on the Hmawbi Farm is in charge of the sugarcane work.

61632. Do you think he gets the necessary facilities for his work?—We do very little sugarcane work at Hmawbi, and the facilities are ample.

61633. Do you know whether he was permitted at any time to visit Coimbatore?—The Horticulturist at Hmawbi was recruited in April this year direct from college and he has not been to Coimbatore. The main sugarcane work in this Province is done in another circle where conditions are suitable.

61634. *Mr. Kamat:* With reference to the question of artificial manures, you have stated that the crop yield can readily be increased by fifty per cent if artificial manures are used?—Yes.

61635. The value of rice exported from Burma in 1926 was somewhere in the neighbourhood of fifty crores of rupees?—I think so; the figures are given in one of the notes supplied to the Commission.

61636. Yes; it is roughly fifty crores. Supposing the ideal conditions were reached whereby fertilisers were popularised in every village and were available at a lower price, do you think that would result in increasing the yield to any large extent?—By increasing the outturn of rice, one does not necessarily increase the profit got from the cultivation of paddy land. One may only be able to increase the outturn of rice by fifty per cent at a financial loss.

61637. Do you mean to deny that there is any possibility of additional wealth being obtained for the Province?—If cheaper manures become available at a price which leaves a margin of profit, the prosperity of the Province could be increased.

61638. At present, the difficulty is that the price of artificial manures is rather high?—Yes.

61639. Do you think the reason why it is high is that the trade in artificial manures is in the hands of syndicates or federations?—No, I do not think we pay more for artificial manures in Burma, apart from freight costs, than other countries have to pay. The real trouble is that the actual value of an acre of paddy is comparatively low compared with that of some other crops, and the increase of fifty per cent in yield represents a very small increase in actual money value and fails to recoup the initial extra expenditure.

61640. *U Ba Cho:* Do you know that most of the lands in Lower Burma are subject to flood, both from the river as well as from the rains? If you use artificial fertilisers, will they not be taken away by the surplus water that comes on to the land?—Not if it is applied at the correct time. Once

the manure becomes incorporated in the soil, there is little danger of its being washed out. Most of the paddy fields in Lower Burma are enclosed by *bunds* which retain both the manure and the water. Artificial manures are not to be recommended for land which is flooded from rivers, but this does not apply to rain-fed land.

61641. With regard to premiums being paid on selected paddy, or on paddy grown from the seed given out from the Government farms, do you know what is the least quantity the big millers will take and for which they will pay a premium?—It depends on the size of the mill. In a small mill they can buy lots of two hundred baskets, but lots of ten thousand baskets will be required for the bigger mills.

61642. Are you aware of the fact that the ordinary cultivator has no opportunity of selling his paddy direct to the mills? He usually sells it to the Chinese traders, who buy from different people, and mix it up before it is sent to the big mills?—That is one of the difficulties in the way of improving the quality of rice in Burma.

61643. *Sir Thomas Middleton:* I think you told us that all the seven varieties of rice which you are at present distributing are selections?—Yes.

61644. Why are you resorting to hybridisation? What is the object you wish to get at?—The selected varieties which we have are not perfect by any means. We want to improve them further. To take a typical example of a cross we have at Hmawbi, which I can show you on Sunday: We have two pure line strains of Ngasein paddy under distribution, one called No. 10 and the other No. 8. No. 8, with a life period of 180 days, suits a wide range of conditions and produces a heavy crop of good quality rice. It is, however, frequently damaged by insect attack. No. 10 with an extra fine quality of rice is better than No. 8, and, under suitable conditions, is capable of producing a heavier crop. It is also a robust plant springing up quickly after transplanting and is seldom, if ever, affected by insects. Its life-period, however, is over a fortnight longer than No. 8, and this means that it is only cultivated on a small scale under specially suitable conditions. A successful cross between these two strains is now in the F. 3 generation, and we have great hopes of obtaining, from this, an improved No. 8 which will have the superior quality and robustness of No. 10 with the shorter life-period of No. 8 and consequent suitability for a wider range of conditions.

61645. Do you think the risk of not getting compensation for unexhausted improvements has any effect on the mind of the Burmese cultivator?—Very little improvement of any kind is carried out at the present time, and I do not think the risk of not getting compensation for unexhausted improvements has yet entered his mind.

61646. You mentioned this point and I was rather surprised; I wondered whether in fact you ever heard a Burmese cultivator raise the question?—It has not been raised but if the question of manuring becomes general it will arise in due course.

61647. Do you find nitrates definitely injurious?—Yes, definitely injurious.

61648. Have you got an explanation?—The usual explanation given is that the nitrates are changed into nitrites under swamp conditions. I am not doing any work in that line but that is the only explanation I have heard put forward.

61649. Can one puddle rice soils too much?—I should not think so, not under swamp conditions.

61650. *Dr. Hyder:* Is Tharrawaddy in your charge?—Yes.

61651. How far is it true that the people of Tharrawaddy are a gay people: I mean have plenty of spirit?—Tharrawaddy used to be a very criminal district, but I am not aware that that is the case now. It is really quite a well-to-do district.

61652. It is a much quieter district now?—It is a much quieter district now and the people are fairly well off.

61653. You do not think that this indulgence in crime is a sort of spare-time occupation for the cultivators of Tharrawaddy?—Not more for Tharrawaddy than for any other district.

61654. To what extent have you won successes in areas sufficiently favourable for success and to what extent in areas in which the urgency of the problem is great?—So far as Lower Burma is concerned, the only problem we have tackled adequately is the improvement of Burmese varieties of paddy, and the success is fairly evenly distributed over all the districts concerned.

61655. With regard to groundnut, the Agricultural Department has scored a success in Upper Burma, but has the department been successful as regards rice in the flooded areas?—There are varieties of paddy already in Burma which are capable of withstanding flood. I can show you some on Sunday. We are working on deep water paddies, as we call them, at the same time that we work on ordinary shallow water paddies and we have several improved strains of this type.

61656. *Mr. Reynolds:* We may take it that in an ordinary Lower Burma district a crop is off the ground by mid-January?—By the end of December or mid-January.

61657. And that for good cultivation, the first ploughing or breaking of the ground ought to be done towards the end of May, if the rains have broken?—The usual practice is to wait for a fortnight after the rains have broken, until the soil is sufficiently soft to plough. It is impossible to plough it immediately after the break of the rains.

61658. That would take it to the end of May?—About the end of May or the beginning of June.

61659. So that there would be about four months in which there is no crop on the ground?—Yes.

61660. Have you in your experiments come across any possible crop that could be grown in this period, supposing labour and irrigation were available?—If irrigation were available, it would be quite possible to cultivate second crops in the paddy land of Lower Burma. It is done to a certain extent; vegetables are grown. The limiting factor is water.

61661. If you had water, you think crops are available?—If water were available, vegetables could be grown.

61662. Would manuring then become essential?—Manuring would be more necessary if two crops were taken in a year.

61663. *Professor Gangulee:* Do you sell the departmental seed at a flat rate to the cultivators?—We have to vary the rate at the central farm; we adjust the rate according to the distance which the seed has to travel. If we rail seed for a hundred miles, the cost to the cultivator, including the cost of freight, would be too high; therefore we adjust the price so that actually when it reaches the cultivator the price he pays in each district is practically the same.

61664. Are the central seed farms actually paying? Have you worked out a balance sheet?—The central seed farm is an experimental farm and is not expected to pay.

61665. What about the district farms?—The only district farms are seed farms which are rented out on a certain system and no loss can be incurred.

61666. They are rented out to tenants?—They are rented out directly to tenants by the department.

61667. What arrangement do you enter into with the tenants?—The agreement is this, that if the seed is a cent per cent pure, the rent is twenty per cent less than it is if the seed is not pure. There is a sliding scale, so that the purer the seed the lower the rent. That has been very effective in maintaining the purity of the department seed in the district seed farms. Without that it was found that seed was liable to be contaminated and was not fit to issue as pure seed.

61668. Therefore it is to the tenant's interest to see that purity is obtained?—It is twenty per cent to his interest to see that it is a cent per cent pure.

61669. *Sir James MacKenna:* Have you read the evidence given by Mr. Swan, of Messrs. Steel Brothers, in London?—I have not seen it yet.

61670. *The Chairman:* Is some of the rice seed which is distributed through commercial channels of extremely low germinating capacity?—The ordinary paddy seed which the cultivator in Lower Burma uses is retained on his own holding and is not really distributed at all.

61671. In the cases where seed is provided, are you satisfied with the germination?—The seed we provide from central farms is invariably above ninety per cent germination capacity.

61672. Now we come to the seed I am speaking about, namely, seed which is distributed by moneylenders or other persons engaged in gainful occupations. Does that represent any important part of the whole?—As regards cotton, I think it does, but not as regards rice. I had one case this year of paddy, sent to the Andaman Islands, the germination capacity of which was only forty per cent.

61673. There is no law on the matter, is there?—No law whatever.

61674. Might there be a law, do you think?—I do not know that the matter is of sufficient importance to call for immediate legislation.

61675. Have you ever observed any tendency on the part of the milling interests to make any contribution towards research in rice?—Financially?

61676. Yes?—No, I do not think they have ever been asked.

61677. Is there any indication that their natural interest in the improvement of the rice grain in Burma might be organised in the form of some joint committee, representative, let us say, of the exporters, distributors, millers, the Agricultural Department and the cultivator?—I think a committee would certainly be advisable. At the present time the millers in Rangoon come to the Hmawbi Farm and see the work which is being done there, and it is our custom, when new varieties are about to be placed on the market, to send them to the Burma Chamber of Commerce to be placed before their Rice Committee, who issue a report in due course.

61678. Do you think that interest might be consolidated in the form of some formally organised body?—I think it might be.

61679. You think that idea is worth probing?—I think it is.

61680. *The Raja of Parlakimedi:* After the paddy harvest and if moisture is available, are any catch crops like greengram grown here?—We have tried practically every crop which is grown in India after paddy here but none has succeeded at all. The Lower Burma rice fields, after being puddled in the rains, dry up with remarkable rapidity immediately the rain finishes, and they are then not suitable for plant growth.

(The witness withdrew.)

Mr. C. W. DUNN, C.I.E., I.C.S., Officiating Financial Commissioner (Transferred Subjects), Burma.

Replies to the Questionnaire.

QUESTION 5.—FINANCE.—(*a*) The better financing of agricultural operations depends on the general improvement of lenders and borrowers and cannot be produced by any single measure. The extension of banking ideas among the lenders and of banking habits among the borrowers and of the knowledge and practice of account-keeping, would be an important contribution to the improvement. In particular, the use made of agricultural produce as security for short-term credit needs improvement. The question refers, I suppose, as usual to steps to be taken by Government. Government cannot do much in the matter directly. A system of registration of title for immovable property would be an economy for long-term credit. It is doubtful whether the quality of the officials or the general standard of efficiency of the population is yet high enough for the introduction and working of a system like the Torrens system.

(*b*) No.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—(*a*) (*i*) I think the question implies a false conception of agricultural credit. Would anybody ask what are the main causes of borrowing in commerce and industry in Europe? It is possible to classify causes of borrowing in very wide classes such as borrowing for capital expenditure and borrowing for current expenses of production but main causes of this kind are not peculiar to agriculture in Burma. The particular causes of borrowing cannot be discovered without a complete examination of the borrower's income and expenditure. If loans are available only at a certain season, or if the lender (as in the case of Government and some co-operative societies) favours certain objects for borrowing, the real cause of borrowing will not be admitted, and perhaps is not perceived, by the borrower, who has adjusted his transactions to suit the conditions of supply of credit. Statistics and opinions of the causes of borrowing often ignore this cause of error.

(*ii*) Friends and neighbours and relations who do not habitually lend money, individuals (Indians, Burmans, Chinamen) who habitually lend money, European banks, and *Chettyar* firms, licensed pawnshops, co-operative credit societies and Government agricultural loans. Government has made recommendations to the Government of India concerning a survey of indigenous banking including the growth of urban and rural savings.

(*iii*) Debts generally are repaid. If they were not, lending would cease. The chief reason preventing repayments is general inefficiency of lender and borrower.

(*b*) What is needed is to bring more capital into agriculture rather than to lighten agriculture's burden of debt. I doubt if the officials and the public are capable of carrying out "special measures to deal with rural insolvency." I understand that the Usurious Loans Act and the provisions of the Civil Procedure Code for the protection of cultivators from harassment by creditors remain a dead letter in Burma. The people interested never ask for and do not know of the existence of such legislation.

(*c*) No.

QUESTION 7.—FRAGMENTATION OF HOLDINGS.—(*a*) Excessive sub-division of holdings does not appear to be a tendency prevailing in Burma at present.

QUESTION 15.—VETERINARY.—(*a*) I am inclined to think that the Veterinary Department should be under the Director of Agriculture on the ground that the welfare of cattle and other agricultural stock is an essential part of the improvement of agriculture. Separate departments are apt to regard the principal objects of their department as the only objects entitled to their support. Matters which lie on the border line between the spheres of two departments are in danger of being neglected, *e.g.*, in this case the problem of improving fodder supplies. The Director of Agriculture and his office will have greater administrative experience than a veterinary officer and the office of the head of a separate Veterinary Department.

(*b*) (*i*) There are only four veterinary dispensaries and they are in municipal towns. The district councils contribute to their maintenance but do not control them. The Prome District Council has objected to being required to pay. Veterinary service is not provided for in the Burma Municipal Act, 1898, but will probably be provided for in the Bill now before the Legislative Council. There seems to be no demand for more dispensaries: the public are inclined to leave the matter to Government which has hitherto been in control.

(*ii*) There is no popular demand for expansion of the veterinary staff.

(*iii*) No. The control of veterinary services is at present divided between the Veterinary Department, the Deputy Commissioner, district officers, village headmen and district council. The district council nominally has complete control, but in fact only pays the contingent expenses of Veterinary Assistants posted to the district by the department.

(*c*) *to* (*h*) These are best answered by the veterinary officers.

(*i*) No.

QUESTION 17.—AGRICULTURAL INDUSTRIES.—(*a*) Cultivators in Burma cannot be averaged for the purpose of a question like this. See the chapter on "General Agricultural Conditions" in the collection of papers by officials in Burma submitted to the Royal Commission. * The several classes of employers and labourers in the area of industrialised agriculture if they are all included in the description "cultivator" cannot be averaged. Labourers employed in this area sometimes have a period of unemployment of various duration after the paddy harvest if they do not work as cartmen. In the Minbu district cultivators have a saying that "one day's idleness brings a month's starvation" and there is no doubt that many of them are fully occupied all the year round, on work on their dry and wet cultivation or in carting the year's supply of firewood or repairing houses and other work connected with the farm. The cottage industries for the spare time of a cultivator's family are generally dependent on local supply of materials, *e.g.*, clay for pot-making, reed or bamboos for mats or baskets. Cottage industries generally do not seem capable of producing any great improvement of the standard of living. The establishment of factories in rural areas where the families of cultivators can find employment seems to offer better promise in this respect. The parboiled rice mills and cotton ginneries employ a certain number of women and children from neighbouring villages. I think it is advisable that Government should do what it can to encourage the growth of small factories in small towns and villages.

(*c*) The Buddhist religion is an obstacle preventing the expansion of industries involving the killing of animals. Non-Buddhists have created important industries in the breeding of pigs, ducks, and poultry for the market. These have not had much attention from Government and I know of no special obstacles to their expansion except Buddhism.

(*d*) There is not much that Government can do directly to establish industries connected with the preparation of agricultural produce for consumption. Rice mills, oil mills, cotton gins, and saw mills have been spreading along the railways and along the creeks in the delta during this century and the progress made has been remarkable without any direct aid from Government.

(*e*), (*f*) & (*g*) Government can do little or nothing by direct measures for these purposes.

(*h*) I do not think that anti-malaria societies and the like fostered by Government will have results of permanent value. Improvement of public health depends on general improvements including extension of general education, newspaper reading and communications. The appointment of District Health Officers working under the district councils, the giving of public health functions to circle boards and the use of village headmen as their executive officers for this purpose, which are now under the consideration of Government, should tend to spread ideas of public health in rural areas.

QUESTION 18.—AGRICULTURAL LABOUR.—(*a*) (*i*) The seasonal migration of agricultural labour is well developed in Burma. Attempts have sometimes been made by district officers in Upper Burma and by the Co-operative Department during periods of hardship due to bad harvests, and where the habit of seasonal migration does not exist, to induce cultivators to go to selected localities in Lower Burma for work. Such efforts have not been very successful and do not suggest the possibility of successful management of labour migration by Government on a larger scale.

(*ii*) The Colonisation Department has recruited colonists from the Prome, Tharrawaddy and Henzada districts and from Myingyan where there was reported to be some land hunger. In some cases these colonists failed owing to want of experience of the colonists in new conditions of cultivation. Men who had worked in the neighbourhood of the colonised lands as immigrant labour for some years were found to be more successful colonists. Nevertheless I think it would be advisable that the Government Estate Department (which has now succeeded the Colonisation Department) should attend to the possibility of recruiting colonists from areas where the occupation of land is comparatively congested.

(*c*) See reply under (*a*).

* Not reprinted.

QUESTION 21.—TARIFFS AND SEA FREIGHTS.—The recent increase of customs duties has been injurious to cultivators in Burma since they had acquired the habit of consuming foreign goods before the increase of the taxes. I believe that the export duties on rice and hides also have been injurious to cultivators in Burma. The demand for rice is elastic whereas the supply is not. In the case of hides the exports have declined since the increase of the duty. I think that the export tax on hides should be removed, and that the export tax on rice also as soon as means of raising equivalent revenue can be devised, should be abandoned. Import duties for the protection of Indian industries should, I think, be revised, at any rate, in cases where the cost of the protection falls most heavily on poor people.

QUESTION 22.—CO-OPERATION.—(*a*) (*i*) Government provides a Co-operative Department and a large staff. I think Government is well advised not to provide money. The work of the department includes many measures for encouraging the growth of co-operation. I have no measures to suggest at present that have not already been attempted or considered by the department.

(*ii*) The most effectual non-official agencies for encouraging co-operation are the societies themselves. At present they lack initiative in taking steps to attract members and to promote the establishment of other societies. There is a lack of societies formed for or prepared to undertake business other than loans. There are, of course, many services the provision of which would probably attract members including savings banks, rice-mills, storage and sale of produce, etc.

(*b*) (*i*) Credit societies are at present making no progress in Burma. An attempt was made a few years ago to stop Government propaganda in the hope that it would be replaced by non-official agencies which had been organised. These non-official agencies have met with difficulties and the hopes grounded on them have not been fulfilled. The credit societies themselves have in some districts become demoralised: a principal cause is, in my opinion, their excessive dependence upon the Provincial Bank which has no personal relations with them. Unless the non-official agencies can be revived, the officers of the department must again be employed in teaching and propaganda. An endeavour should be made, in my opinion, to compel the societies to rely upon local deposits or even local moneylenders rather than upon the distant Central Bank.

(*c*) I see no objection to legal compulsion of a small minority to enable schemes for improvements to be carried out. But if compulsion is applied, I suppose the undertaking cannot properly be classed as co-operative. The undertaking of the construction, maintenance and repair of small embankments and canals by district councils in accordance with Order 11 in the Burma Rural Self-Government Act, 1921, requires unanimous consent in writing of persons who had previously constructed or maintained the works. These restrictions ought, I think, to be modified.

QUESTION 23.—GENERAL EDUCATION.—(*b*) (*i*) Better payment of teachers, better school buildings and equipment and more schools. I think proposals for special curricula to retain the interest of agriculturists in the land are misguided. If the whole population is given a higher standard of general education it will not prevent a part of the population being interested in the land. A general education rather than specialised instruction will improve the efficiency of the agricultural population. As long as educated persons are rare, they will be drawn to the most attractive occupations and places. Students of the Agricultural College seek posts in the Subordinate Civil Service or the Income Tax Department, notwithstanding a special curriculum. If a certain standard of general or literary education were general, boys from rural villages would not so generally be drawn to employment as clerks.

QUESTION 24.—ATTRACTING CAPITAL.—(*a*) A greater amount of capital and enterprise will take to agriculture if the remuneration to capital and enterprise in agriculture increases so as to attract them. The price of paddy appears to be lower relatively to other prices than it was before the War. This is a condition discouraging to capital and enterprise in agriculture. The industrial organisation of paddy cultivation in Lower Burma since 1869 has given improved remuneration to capital and enterprise and

has had a great effect in attracting both. Other improvements in agriculture like the introduction and extension of groundnut cultivation in the dry zone have the same tendency. The steps which Government could take include the revision of import and export duties, and the abolition of those duties which tend to discourage investment of capital in agriculture.

QUESTION 25.—WELFARE OF RURAL POPULATION.—(*a*) Rural local self-government should, in my opinion, be developed and extended with less timidity than hitherto, and local taxation especially should be induced by the organisation of local demands for improvements and by cutting off the supply of unlimited doles from provincial revenues for local objects. Local Government authorities for territories smaller than a district are necessary. Corruption and waste of money are risks which must be accepted. Taxation by autonomous local authorities would probably in the end become an important means of raising public revenues for improvements in education, public health and communications.

(*b*) I am not in favour of Government economic surveys made for no immediate practical purpose. The general collection of statistical information which is not put to practical tests, is not subjected to the criticism of interested parties and which is carried out by Government staff would, I think, give untrustworthy results and would be an unjustifiable diversion of public funds from more urgent uses.

(*c*) My experience of enquiries by settlement parties and by officers of the Co-operative Department indicates the difficulty of preventing the information recorded from being incomplete and misleading. These difficulties are well known and any staff capable of surmounting them would be very costly if it could be obtained at all.

Oral Evidence.

61681. *The Chairman:* Mr. Dunn, you are officiating Financial Commissioner (Transferred Subjects), Burma?—Yes.

61682. Are you the residuary legatee of the Development Commissioner?—Yes, except that I do not deal with minerals; the late Development Commissioner dealt with minerals. I deal with local self-government to a certain extent.

61683. You deal, in your answer to Question 5 (*a*), with the matter of the better financing of agriculture. You suggest the extension of banking ideas amongst lenders and of banking habits amongst borrowers. What exactly have you in mind there, when you are dealing with the small cultivator: the use of the cheque?—That would take a long time to introduce in country places, but I should like to develop savings banks and the use of documentary security in connection with his crop; I shoul like to have co-operative godowns in which a man could place his cr and get a receipt which he could use for credit purposes. I was going suggest another improvement in connection with the financing agricultural operations and that is the improvement of the native syste of pledging crops before they are reaped. A great deal of business by w of financing of agricultural operations is done at present through advanc on the crop before it is reaped. There is a regular system of documen and that kind of document I should like to improve. That will improve t business done.

61684. Is it a flaw in that system that it does not secure to the grow a fair share in the event of high prices?—The advance that the grow can get is to a great extent conventional, and sometimes he finds that t harvest price is very much greater than he expected; if that proves be the case the position requires a good deal of improvement in th respect.

61685. Would you turn to your answer to Question 6 (*a*) (*i*) which dea with indebtedness? What we are concerned with is to discover wheth the debt is borrowed for productive or non-productive purposes. That the main position, and I think you would probably agree that that divisi is both practical and important?—It is a very difficult question to answe It is not possible to identify the real purpose of borrowing without taki

the whole of the borrower's affairs into account. The standard of living is going up. It is very difficult to say whether the improvement of the standard of living is a productive purpose or a non-productive purpose. Take, for example, the building of a better house.

61686. I agree that it is difficult to place this in this or that category. If a man buys fireworks under what head would you put it?—The standard of living is going up. It is rather difficult to say. I think the people in Burma spend a certain sum on fire balloons.

61687. You say that the Government of Burma has made recommendations to the Government of India concerning a survey of indigenous banking, including the growth of urban and rural savings. What is indigenous banking?—I admit there is difficulty in defining it. I do not think you can draw a line anywhere.

61688. I think you might as well talk about indigenous electric light?—It depends how you define banking. I included even the pawnshops in Burma when I wrote about indigenous banking, the Chinese pawnshops. It is a very big business now.

61689. In answer to Question 6 (*a*) (*iii*) you say: "Debts are generally repaid. If they were not, lending would cease." Is it your experience in Burma that lenders press very hard for actual payment?—I think not. There is a general slackness.

61690. Is there much foreclosing in the event of secured debt not being paid?—There is a good deal of foreclosing of mortgages.

61691. Does the average moneylender in Burma desire to get hold of the land?—The *chetties* are not at all desirous of getting hold of the land. They are the most important moneylenders.

61692. That is the last thing they want to do?—They certainly do not want the land. The Burman moneylenders in many cases do. Not all.

61693. I do not quite gather from your answer to Question 6 (*b*) whether you think that something might be done by the amendment of the Usurious Loans Act or otherwise or whether you think it is better left alone?—I do not think that anything can be done by amendment. However good the Act, the Judge does not know that it is there.

61694. That might be done by a civil letter pointing out that it is there?—It has been done. They forget. Judges are transferred. It is impossible to expect the court to take the initiative in these matters.

61695. I pass on to your answer to Question 15 (*a*). I think there is an alternative arrangement which apparently you do not contemplate. That is that the veterinary subjects proper should be under the Veterinary Department, independent of the Director of Agriculture. I do not know whether that arrangement would commend itself to you?—The improvement of cattle, that is to say, stock-breeding is done now, by the Deputy Directors of Agriculture; it is not done by the veterinary officers and I still think that the Veterinary Department would be better under the Director.

61696. You base your argument on the ground of the welfare of the cattle and the improvement of agriculture. Have you borne in mind the effect of your suggestion on the Veterinary Service who may feel that they do not have at its head a man of the status of a Director and that such a post is not open to them?—I was aware of that.

61697. That is a very important consideration, is it not?—There is a fallacy in it. I think the position could be met, perhaps, by giving what they call a selection grade post. For example, it seems to me altogether a fallacy to think that it is a good thing for the Medical Department to put the most skilled surgeon in the Province in an administrative post and make him decide the salaries of clerks. I think the best surgeon in the country ought to have better pay than the Director of the Medical Department if he is worthy of it. You ought not to take him off his work as a surgeon and put him in a post where he will have to decide purely administrative questions. That seems to me an altogether mistaken procedure.

61698. You must be careful in comparing conditions in Europe, for instance, with conditions elsewhere where there is probably not so much

scope for private practice. Can you conceive of a Veterinary Officer being a Director of Agriculture?—I think it would be a very unsuitable arrangement.

61699. Will you enlarge on what you have said in answer to Question 21? What exactly are the goods the consumption of which has decreased in Burma since the increase of the import duties?—I did not say that the consumption of foreign goods in Burma has decreased.

61700. Do you suggest that there is a decrease in terms of cash?—People do not like giving up the use of the foreign goods that they have got accustomed to, even though they are less able to pay for them.

61701. To what would you attribute the decrease in the number of hides exported?—I believe that is due to the export tax. I could not say whether alterations in the classification have affected the Burma trade. There may be something in that.

61702. Supposing that it is a point of classification, where have the hides gone to?—They become dust or are left to rot, or so they tell you. I have asked some of the people in the trade. They say that business has fallen off very much. Dealers were at one time organising their staff for up-country buying. A large number of buyers were doing vigorous business. It is only by having sub-agents everywhere that the exporters got their hides but they have had to withdraw their up-country staff. The cultivators will not bring their hides over long distances to uncertain markets. They will not sell them at all unless there is a buyer at hand.

61703. Why not?—Because they do not want to go too far.

61704. Has that got anything to do with the tax?—The tax has had the effect of contracting the staff. The profits have fallen, and the exporters have had to reduce their staff. That is what the exporters tell you. The cultivator is not getting a market in so many places as before for his hides.

61705. *Professor Gangulee:* Why should that be the case?—The Burma hides are particularly bad in quality and cannot stand taxation. That, in turn, is due to the fact that cultivators do not know how to flay or how to treat the hide after it has been flayed. That is what I am told and from my own observation I think that is true.

61706. *The Chairman:* I think you have now severed your connection with the co-operative movement. What was your position?—I was Joint Registrar for a number of years and I was Registrar.

61707. When did you cease to be Registrar?—In 1923.

61708. How many years have you been in the department?—Since 1911.

61709. So you witnessed the beginnings and the growth of co-operation in Burma?—Yes.

61710. Was it a promising movement in the earlier stages?—I think so.

61711. Was the spade work well and truly done? Were the foundations well laid?—I think the beginnings were very sound.

61712. Is the ordinary individual member of a primary credit society capable of understanding the principles of co-operation?—I shou'd not like to say that he was capable of it. We did our best to make him understand, and I think he understood as much as you could expect a cultivator to understand.

61713. You and your colleagues appreciated the educative value of the movement?—Yes; Mr. English always made it a fundamental point with every member of the society to understand what he called the ten main points. I do not believe that in any other Province of India the importance of the member's knowledge has been more emphasised than in Burma, and I think the effort to give instruction has had a considerable success. Whatever fears there may be for the existing co-operative societies in Burma, one thing is certain, and that is they have done a good deal in the way of adult education.

61714. Were your conferences conducted in the vernacular?—Yes.

61715. Are you satisfied with the state of the co-operative movement in Burma to-day?—I am not. I do not suppose that anybody ever was satisfied with the present state of any co-operative effort. It can never rest where it is.

61716. Do you think the movement has continued steadily to grow in soundness as well as in numbers, or do you think there has been some decline in soundness?—It has come to a dead stop in Burma during the last two or three years. There has been no increase in the number of societies or in members.

61717. Have many societies been wound up?—A large number have been wound up; there are about five hundred now under liquidation. They are mostly in what we call the dry zone.

61718. Is that policy of winding up a sound one in your judgment?—I myself think that a society that is demoralised in some cases must be wound up, but it is a matter of controversy between officers in the department. Some officers think that no society should ever be wound up, that the trouble is just due to one or two members, and that if sufficient study were given to it, the right men could be put in charge and the society thereby saved. But there are, obviously, cases where that cannot be done, where one or two persons dominate a village and where the village is small you cannot get the necessary change in the management. If you cannot study the society as closely as that then, perhaps, liquidation may be a mistake.

61719. Do you think the Co-operative Department exercises as firm a guiding hand as it did, let us say, ten years ago?—It can hardly do that because the Registrars have been continually changing. Ten years ago the men in the department were men who had been many years in the department and who had founded many of the societies themselves, and had built up the rules and by-laws; and they knew the routine work thoroughly. In the last three years the continuity has been broken. New men have been put in who did not know the routine and who would naturally be overwhelmed by the considerable volume of routine work. These men not only did not know the routine, they were also unacquainted with the societies, so that it was less easy for them to exercise control.

61720. Who took over from you as Registrar?—Mr. Couper.

61721. And he has had experience of the department?—Yes, but he only outlasted me about a year and then Mr. Steavenson carried on, with an interval of leave, for about two or three years. He was succeeded by Mr. Pattle who remained some six or eight months. Now Mr. Searle is in charge and he has been in his job about six months. Among all these officers Mr. Couper had previous experience, Mr. Steavenson had a little, but the others had not.

61722. These gentlemen have no doubt been doing their best?—Yes, they were specially picked men who were considered to be able, and they naturally did their best. But, as I said just now, the situation is not the same as it was ten years ago.

61723. Are you satisfied with the state of the department in relation to the co-operative movement at the moment?—Things are in a very bad state just now. In fact there is not a co-operative movement. The societies at present are not getting any new members or doing new business.

61724. Did you form the view that there was a possibility of developing co-operative selling societies dealing, in particular, with rice, in Burma?—Yes, we have always thought that it ought to be worked up to; it requires education as much as, if not more than, co-operative credit.

61725. There are difficulties with regard to management?—Yes. My view is that it is more likely to create a co-operative movement than co-operative credit is, because that is a thing for which there is no supply, whereas in credit there are very large supplies though perhaps not all of the best kind. They have got sources of credit but they have no organisation for managing the paddy markets.

61726. Did you form the view that the operation of your credit societies has had any effect upon the rates charged by ordinary money-lenders for loans?—It certainly has in some localities. The *chetties'*

rates generally have been coming down. I do not know to what extent the co-operative societies have effected that. The total volume of co-operative societies' loans is not very large but they may have had an effect out of proportion to their volume.

61727. We understand that it is under consideration whether a special officer should not be appointed to deal with inland fisheries?—It has been practically decided to appoint one.

61728. Do you know at all when he will take up his appointment?—I think in April.

61729. To what service will he belong?—He will be a member of the Indian Civil Service. He is a man who has served in the delta districts and has taken an interest in the fisheries.

61730. Will he be supported by any technical staff or appliances?—There will be no technical staff at first. He has to gather information and advise Government. He is not given any limiting instructions, but he has to make a scheme and advise Government. I take it that if he could convince Government that a technical staff is wanted, he will get it. But Government knows so little about the fisheries that it wants the subject to be studied first.

61731. A preliminary survey of the whole situation is what is required at first, I suppose?—Yes.

The Commission then adjourned till 10 *a.m. on Thursday, the 3rd November,* 1927.

Thursday, November 3rd, 1927.

RANGOON.

PRESENT:

The MARQUESS OF LINLITHGOW, D.L. (*Chairman*).

Sir THOMAS MIDDLETON, K.B.E., C.B.
Sir JAMES MACKENNA, KT., C.I.E., I.C.S.
Mr. H. CALVERT, C.I.E., I.C.S.
Raja Sri KRISHNA CHANDRA GAJAPATI NARAYANA DEO of Parlakimedi.
Professor N. GANGULEE.
Dr. L. K. HYDER.
Mr. B. S. KAMAT.

Mr. H. O. REYNOLDS, I.C.S.
U BA CHO. } (*Co-opted Members*).

Mr. J. A. MADAN, I.C.S.
Mr. F. W. H. SMITH. } (*Joint Secretaries*).

Mr. C. W. DUNN.

Further Oral Evidence.

61732. *The Chairman:* I think that cattle insurance societies have been something of a feature in this Province?—Yes; they were started by Mr. English in the early days. They have not made any headway for a good many years, in fact since the beginning. At the beginning there was a sort of compulsion in that the members of the credit societies were expected to join the insurance societies which were associated with the credit societies and they were given advantages in respect of their loans, that is to say, a man whose cattle were insured could have his insured cattle reckoned for security for his loans at more favourable prices than uninsured cattle. But the scheme has not taken on, and it has not appealed to cultivators apart from the connection with the loans in the credit societies, and even that has not taken on in Lower Burma.

61733. Can you give us the reasons why this particular branch of the movement has failed?—I do not think I can give any definite reason. I will only say that it could have been pushed more, and I think it was probably due to want of continuous propaganda. The conditions were favourable; one used to find the cultivators themselves forming associations to compensate one another for the death of their cattle, and they would have an agreement to subscribe one rupee each when a beast died. But these associations generally had a short life, because when somebody's bullock died, it was perhaps not a plough bullock, and the question arose whether or not the agreement covered any but plough bullocks. There was apparently some sort of demand among the cultivators and we tried to pick that up and give them regulations and provide for safety. Government, when Mr. English started the scheme, was asked to give a guarantee and they did give a guarantee, but they made stipulations for safety and imposed rather high premia. The rate of premium was at first five per cent.

61734. Did that cover the risk of rinderpest?—Yes; that was for practically all risks. The premium was too high and that discouraged business. But we got over that. The thing was elaborately safeguarded, and the reserves grew rapidly so that there was no need to carry on the Government guarantee. It was decided to dispense with the guarantee and the societies reduced their rates of premia.

61735. Had you re-insurance?—Yes, there was a central re-insurance society. It was a carefully worked out scheme, but there was lack of propaganda, and it wants continuous work to bring it on. I think it was a hopeful scheme myself, whatever might be said of its economic value in that its effect is only to spread the loss amongst the cultivators and not to check rinderpest.

61736. There is before the Commission a draft bill dealing with the establishing of your Land Mortgage Bank. The bank will be controlled by that legislation and not by the Co-operative Act; do you approve of that principle?—I think it is convenient to have a special Act for long-term credit.

61737. Where the borrower of money on a long-term basis is the same individual who borrows short-term money from a primary society, do you think there are advantages in having his long-term loans advanced by the same society which gives him short-term loans?—I am inclined to think there are considerable dangers in that. The agricultural banks in Egypt, we were told, had what they called short-term loans and long-term loans, and when I enquired about it, just before the War, they were getting into considerable difficulties, and they told me that their experience was that all the short-term business gradually flowed over into the long-term business. They have been troubled in that way, and we should complicate our finances if we began financing long-term credit with money derived by drawing from deposits. It would make things rather more difficult for the managers of the Central Banks, and we must not demand too high a standard. It seems to me that it is not wise to make things difficult for the future managers.

61738. I am not quite sure I quite understand your point about the experience in Egypt. You think there was some confusion?—We are having difficulty with the punctual repayment of short-term loans. There is a temptation for the manager of a primary society when a member, who is a friend, does not pay his debts for two or three years to convert his arrears of temporary borrowings into long-term mortgage loans. That is encouraging bad business.

61739. Do you not think that the trouble in Egypt was due to the grant of long-term credit without sufficient examination of the borrower's fitness to receive a loan?—Yes. In the absence of local knowledge of the borrowers there was trouble. They relied, I think, on inspectors to supply information; they did not get the information from the neighbours, which was more valuable.

61740. Would it not be unfortunate if a long-term credit bank were forced to be foreclosed as the result of indiscriminate granting of loans?—That would be disastrous.

61741. That can only be avoided by the very careful examination of the personal character and financial position of each applicant for long-term money, and for that a sufficient agency on the spot is essential?—Yes; we want knowledge of the borrower.

61742. What is your view of the state of local self-government in the rural areas to-day? Has it improved?—We have hardly any local self-government as yet. We have got a Local Self-Government Act; we have elections under the Act; but it lacks some of the essential features of local self-government as generally understood, or at any rate as understood in England. The local bodies have no powers of taxing in practice. In the Act there is a tax on circumstances and property provided for, but no rules for the application of this section of the Act have been made yet, and the principle of a local tax on circumstances and property has now, I think, been abandoned as unsatisfactory. Proposals are being considered by the Ministry of Local Self-Government for an extensive alteration of the Act and for other improvements in local self-government. We have been very much behind India in local self-government. India has had district boards for a long time; for generations past; Burma had district funds run entirely by the Deputy Commissioner and his officers, but we had no local boards or councils, even advisory, until the recent reforms when we brought in this Local Self-Government Act, so that when the new body started they were extremely handicapped by having no established routine, their staff was untrained, and they have been getting into considerable trouble in their finances.

61743. Have they official or non-official chairmen?—Non-official chairmen.

61744. Have you been able to gauge whether these local bodies are willing to tax their districts?—I am sure they are unwilling. They pass resolutions, but I do not think, in their present constitution, they are willing to tax the districts. I believe they would be willing to tax if their constitution were altered. It has been said long ago by the Decentralisation Commission that district boards in India have too large areas to administer; they do not know their districts; their constituencies do not know them; they are not themselves in a position to represent public opinion and to venture to tax; the areas are too large. The Indian Taxation Committee said the same thing. If you want local taxes you must have smaller areas where the representatives know the locality and the local people will follow their lead. At present the members of the district council take the place of the Deputy Commissioner in administration, but they have no confidence as representatives and they will not be able to do what seems to me of the greatest importance in this country, that is, to increase the total amount of public revenues by making local demands a means to raise revenues for meeting local needs. That would be something like the American special assessments responding to demands for improvements. We have got certain local demands; we should harness those demands on to local government machinery. If we do that, I think there is some hope of getting funds for developing the country. That gives better hope than provincial taxation. The provincial council is in the same position as a district council; it does not know the country and the country does not know it; in other words, it is not sufficiently representative to have the courage to tax.

61745. You told us yesterday that your present office is in fact, with minor changes, that of the Development Commissioner which existed in Burma up to a few months ago?—Except that the subject of minerals, which took up a considerable part of my predecessor's time, has been transferred now to the Financial Commissioner for Reserved Subjects, and I keep a certain amount of work connected with local self-government which I was doing when on special duty in the Ministry.

61746. In your view, is it the case that this attempt to ensure correlation between the work of several departments in the Province by means of the Development Commissioner responsible for that co-ordination, has been successful?—I have been in this office only for five months, and for a short time some years ago. I cannot say that I think the co-ordination has been a complete success. I think that the Registrar of Co-operative Societies does not know what the Director of Agriculture is doing in some respects. Occasionally, I am able to act as a connecting link. For instance, in a small matter that occurred last week I found that the Director of Agriculture was proposing to constitute agricultural improvement committees, which would hold agricultural shows and the like. The Co-operative Department, long before, had established agricultural and co-operative associations for the districts with very much the same kind of objects, and the two departments were starting separate organisations parallel to one another without co-ordination.

61747. It occurs to me that there are two means by which, if one happened to hold the office which you are now occupying, one might attempt to achieve co-ordination. Either one might take the policies of the several departments for which one was responsible and try to see that those policies in fact chimed each with the other in accord with some general scheme of development, or, *per contra* one might attempt to bring the heads of the several departments together and trust to that to effect co-ordination and correlation of the work; or, it might be possible, and it would probably be wise, to proceed by both methods. Broadly speaking, which conception do you believe would best achieve the object in view?—The second conception is a board of control with the heads of the departments on the board, and the other is single head control.

61748. Well, that would be a formal expression of the idea?—It seems to me rather a complicated problem. I expect the board of control is probably the solution which we shall arrive at. It seems to me difficult to get the single head control. Under the present arrangement of things,

if I or my successors tried to control at all closely, or an Indian civilian coming in had ideas of his own, and tried to make the Director of Agriculture work them out, or the Registrar of Co-operative Societies, he would have considerable difficulty. It seems to me what I am now doing is something of the nature of the work of a board. I take Mr. McKerral's ideas and I introduce them to the Registrar, and try to make co-ordination in that way. If I try to force my ideas on the head of another department, you have got a man who regards himself as head of the department, and he will resent the interference. I think you will see it in the files.

61749. I think one's experience of administration in general is that real co-ordination is much more likely to be achieved by informal discussions than by a steady interchange of papers between departments. Is it your impression that there exists in this Province to a sufficient extent the practice of going round and seeing the other man and working out a policy together?—No. I think there is a certain lack of that practice.

61750. Do you regard that as a very valuable practice?—I think it would be a very great advantage. I think that Agriculture, Veterinary, Co-operation and Cottage Industries, and so on must work together, or they will fail in their objects.

61751. I think, in this Province, as in other Provinces, you are contemplating the initiation of a Superior Provincial Agricultural Service?—Yes.

61752. Have matters proceeded to the point of drafting rules regarding status, and so on?—There are rules, under the Public Services Delegation Rules, which give the Local Government power to make rules for regulating the conditions of service, pensions, and so on, of the services under the Provincial Government.

61753. Is it a mere tentative draft, or does it, in your view, represent the probable decision of Government?—Government has held meetings with the heads of departments concerned and discussed the matters to be dealt with in the rules. On the initiative of the Finance Department, Government has laid down various points on which each department should make rules, and has distributed these instructions to the departments, and they are now framing their rules on the points. I think there are twenty-one points on which rules are required, and draft rules under these instructions have been prepared for the Superior Agricultural and Superior Veterinary Services. There are certain rules that are going to be framed for all the services alike, but each department would make special rules for its own services.

61754. It has been suggested to me that the rules as regards the cadre of the Superior Provincial Agricultural Service will be the same as those for the Burma Forest Service, Class I. Is that so?—Yes. I understand that Government has adopted a general standard scale of pay for all the superior services in all the departments.

61755. Can you provide us with a copy of the draft rules?—I think there will be no objection if I give you a copy of the draft rules.

61756. In your view, is it necessary that the scale of pay should be sufficiently attractive to ensure the recruitment of the best type of men?—Yes, certainly. I do not think you can attract men in this country by any other inducement except pay.

61757. Do you think the pay for the Superior Provincial Agricultural Service is, in fact, sufficient to attract the right type of men?—I think so. The rule has been made in consultation. The people consulted have been, I understand, the men responsible for recruitment of their departments. I think that the Director of Agriculture is satisfied with the proposed rates of pay.

61758. *Sir Thomas Middleton:* You told us that you are not troubled in Burma with excessive sub-division of holdings?—Yes; that is generally true.

61759. What would you consider as the smallest economic holding desirable for the rice area in Burma?—The rice area would include, of course, the whole of Burma, and it would be an impossible area to talk about. There is the highly industrialised area round Rangoon and the ports with

large farms working for the export trade, which is quite different from the areas of subsistence farming such as Katha district has, where the cultivators will probably make you a present of as much paddy as you can carry up out of the valley though the holdings are small. It seems to me very difficult for anybody fairly to say what an economic holding is for the whole Province, and for practical purposes, if it were a question of financing the cultivator, I should be inclined to assume that the normal or average holding in a district would be an economic holding for the cultivator, that is to say, a cultivator with a holding of that size can probably hold his own, and his undertaking would be good investment for money. For instance, the average size of the holding in the north of the Prome district, according to the latest settlement reports, was about nine acres. In the southern half of the Prome district, the average size of the cultivator's holding was about eleven and-a-half acres or so. In the next district, towards Rangoon, in the north of Tharrawaddy district, the average cultivator's holding was fourteen acres, and in the southern part of the Tharrawaddy district, as you move towards the port, it was twenty-two acres. As you get nearer the port, the average size is rising. I should say that the economic holding in North Prome would be nine acres, and in South Tharrawaddy twenty-two acres.

61760. These figures give the average size of the holding. When would you consider that the holding was being excessively sub-divided? You told us there is no excessive sub-division?—I do not venture to say that.

61761. That there is no such tendency?—There is not excessive sub-division in the sense of fragmentation: there seems to be a difference in that. Mr. Calvert's difficulty in the Punjab was largely fragmentation. A man might hold altogether a sufficient number of acres, but he had it in five to twenty fragments, with the consequence that he could not finance a well to irrigate. We have not got that trouble here, as far as I know at all. We have a free trade in land. The Burman agriculturist regards his land as so much stock-in-trade or plant for his paddy factory. He will sell and buy with equal readiness, and he does. If he inherits two pieces of land far apart from one another, he will sell one and buy another piece more conveniently situated.

61762. I was not thinking of fragmentation, but of the total area that the cultivator must have in order to make a living?—That is a varying quantity according to the conditions. Prome, with its nine acres as an economic holding, may continue to have nine acres, if it organises itself with co-operation for sale and for milling its rice. In that case, the nine-acre holding may maintain itself indefinitely. On the other hand, in the Tharrawaddy district, it has reached twenty-two acres; the smaller men are being squeezed out.

61763. Take Prome with its nine-acre average. The holding might vary from, say, six acres to twenty-five acres. When would you consider the holding to be too small?—I should not like to fix any amount, because people have other sources of income; but if the cultivator has no other occupation but agriculture, nine acres probably is the economic holding.

61764. *The Chairman:* Of good rice land?—That is in Prome, the rice land of which is not good. It has to be manured heavily, and the capitalist will not buy it, because it is in too small plots, which requires too much attention from the owner.

61765. *Sir Thomas Middleton:* If you found many holdings of five acres in Prome, would you say that there was excessive sub-division in that area?—I do not think I found that. If they were uneconomic, the people would become coolies. There seems to be some confusion of fragmentation with the size of the holding. I should say that in the other sense the holding that is financially impracticable simply cannot survive. In the more advanced industrial areas I think you will find there simply are not five-acre men, generally speaking; they simply do not exist, and they could not exist because the man in one season would starve. In other localities the thing is complicated by the income being helped out by trading and other sources of income. In the Prome district, for instance, there is an immense amount of trading by families of cultivators.

61766. The maxim which you quote in answering Question 17 seems to indicate a remarkable appreciation of the value of time on the part of

the Burman cultivator; one day's idleness brings a month's starvation. Does that apply to the 365 days of the year, or does it apply to some day at a particular period, say, during rice planting?—My friend used to tell me he applied it to every day of the year; he said he had not got any holidays: he could not spare the time.

61767. But time cannot be so valuable as that?—Of course, he was an uneducated man, but he would argue it out and tell you what he had got to do every month and every part of the year. That was a place in the dry zone; it was not in the pure one-crop area of Lower Burma, to which the criticism as to idle time applies better.

61768. It could only be true of an agricultural population if, on every day of the year, there was some particular duty which had to be attended to, and which, if that time were allowed to pass, would mean failure of crop?—That is of course pressing the proverb very close. It was enough for his practical guidance that he could not afford to be idle.

61769. It is a very interesting proverb, as throwing light on the Burman's appreciation of the value of regular work?—Yes. He thought he was a hardworking fellow and looked upon people with salaries as enjoying idleness.

61770. In answer to Question 22 (c), you refer to the construction and maintenance of small embankments and canals by the district councils. Do the district councils do the work satisfactorily? Is the maintenance of the small embankments and canals reasonably satisfactory?—The district councils do not do it at all at present; they have got the powers under the Act. As I say, we have practically no local self-government; we have got an Act and we are gradually trying to introduce it. The local bodies at present, in practice, do nothing in regard to small irrigation works.

61771. What is happening to the small embankments and canals at the present time? Is anyone looking after them?—Government had a scheme for encouraging them by giving half the estimated cost in a free grant and allowing the promoters of the scheme to obtain the rest of the capital by a loan under the Land Improvement Loans Act, 1883; that was brought in about 1920, but the amount of money given out in these free grants has been negligible. There are difficulties because the unorganised cultivators generally cannot unite to give security for the loan or to organise the work; they have a difficulty in initiating it.

61772. In answer to one of the Chairman's questions you used the terms: 'long-term' and 'short-term' credit. In Burma, what is the particular meaning applied to short-term credit? Is it credit for the period of one crop?—I think, in regard to agricultural credit, that would be the meaning: a loan taken for cultivation purposes, paid at harvest when the crop is sold.

61773. In practice in Burma it would be about eight months?—Yes, from five to nine months. I think we sometimes include loans taken for cattle which are repayable in two or three years; we might include that. The term, of course, is not strictly defined.

61774. You do allow as much as two or three years for repayment for purchase of cattle?—Yes; for instance, we call all the business done by our agricultural credit societies short-term credit as distinguished from the loans of agricultural land mortgage banks which would deal in loans of more than five years.

61775. In Burma with your chief crop ripening at one period of the year, the early spring, when does your settling time come?—The main crop, the paddy crop, is reaped throughout the country between November and February; but there is paddy being reaped in every month of the year in Burma. Generally speaking, for Upper Burma crops it is December and January, and then there are other crops from the islands, on the alluvial soils, which are gathered in April and May. The principal harvest time you may say is December and January.

61776. Then each credit society has its own time for settlement?—Its time for settlement is generally supposed to be fixed in reference to the harvest time; for instance, a credit society on the islands growing crops on alluvial soil would have its settlement time fixed for May or June.

61777. How do you estimate your overdue payments? Do you take one date for the whole of Burma and take the overdues at that time?—No, we do not attempt anything of that sort, because dates for repayment vary. For the purposes of the annual reports of the Registrar of Co-operative Societies, in fact, we do not estimate overdues. What we do is this: the annual report compares, from year to year, the proportion of the total repayments received with the total of the loans outstanding at the beginning of the year *plus* the loans issued during the year. That, obviously, is a very rough comparison, because some of the loans issued during the year may not be due for a year or two years; but we think any exact figures would involve more labour than it is worth.

61778. From the figures which are available, could you, for example, who know the movement thoroughly, trace in, say, a period of two or three years, any considerable increase or decrease in outstandings?—I think these general figures would show you that at once. If you have got the amount issued during the current year in loans, the amount outstanding at the beginning of the current year and the repayments during the current year, you can see how much consists of old loans.

61779. You could trace tendencies quickly?—Yes, I think so; I think those figures enable you to see if the number of societies and members is increasing rapidly and the size of the loans is going on increasing; you would have to have some knowledge of the business.

61780. If all loans were for crop, then it would obviously be quite easy; but when you have a certain proportion of the loans, I do not know what proportion, for livestock, which loans may fluctuate in different periods, then the livestock loan figures might obscure the tendencies in the crop figures?—Yes, on the figures one could not get rid of that. There is a certain amount of loans being given for cattle and for certain other purposes, building houses and so on, which will be spread over several years.

61781. I am thinking of the difficulty of interpreting these statistics and of drawing conclusions from such figures when one is unfamiliar with local conditions?—The statistics are very imperfect for a stranger to interpret; but if you ask us to give you more perfect statistics, it will divert the attention of the department from propaganda or inspection and other work to office work on statistics.

61782. Quite so, and therefore the only method for the stranger would be to ask you to form your conclusions and give us your conclusions and not your figures?—Yes, and of course that is a very fallible source of information.

61783. It may or may not be fallible?—It is of varying value.

61784. *Mr. Calvert:* When you say that debts generally are repaid, do you mean to say there is practically no ancestral debt at all in this country?—I do not mean to say there is none; I do not think it looms very largely. The village *bania* who, I understand, exists in India with a record of his clients going back several generations, does not exist here. I think a man would do his own bankruptcy proceedings in this country; he might migrate to Lower Burma if he got into real trouble and would not be heard of any more. I suppose he is not so much tied to his village as in India.

61785. You make rather a surprising statement in answer to Question 6(*b*) when you say you understand the provisions of the Civil Procedure Code are a dead letter?—Yes.

61786. The Usurious Loans Act may be a dead letter, but are the provisions of the Civil Procedure Code, for the protection of cultivators from harassment by creditors, also a dead letter in Burma? Do you mean to say that the cultivator's plough cattle, seed and so on are sold for debt?—I have not been working in the Co-operative Department recently, but when I was in the department it was ignored by the courts.

61787. Does the Judicial Department take no measures?—I think they take no measures at all. The officers of the department tell me that, in the present condition of things, it is no use trying to get the Judicial Department to take a friendly interest in matters of that sort, that times have changed. Formerly, if you wrote demi-officially to some high judicial authority he would try and see that his officers would enforce measures like this, but now the courts take the view that they have no duties except

on being moved to act in legal form, and they would await for a test case or some application of that sort before they would give an order. That is what was said to me by one of the officers of the Co-operative Department.

61788. That practically means there is no hope for the salvation of Burma through legislation?—You must educate the people up to the legislation first, it seems to me, including the Government subordinate officers.

61789. Do you accept the opinion of one of the late Registrars that Upper Burma must be abandoned as a field for co-operation?—I certainly do not; I think that would be an absurd conclusion. Co-operation ought not to abandon anything that any private man will not abandon; the *chettyars* and Indian moneylenders are not abandoning Upper Burma; on the contrary, they are making very good business there, and if co-operation cannot do it, it is owing to the stupidity of co-operation which must be got rid of. I do not see any reason why co-operation in Upper Burma should be abandoned; the conditions, of course, are very different.

61790. You say Government provides the Co-operative Department with a large staff. Do you think there are defects in the staff which account for the decline in the co-operative movement?—Yes; without disparaging any persons, as I was mentioning yesterday, there has been a constant change of Registrars. The recent Registrars may be better men than the previous ones as to ability and so on, but they certainly were not as regards continuity of experience. Then, Burma, as regards the other members of the staff, has suffered as compared with your Province, as I know myself, from the difference in the supply of educated people in the Province. I went to your Province and saw your Assistant Registrars, and one thing that struck me as one among the causes of the success of co-operation in the Punjab is the high quality, the high education, of the Assistant Registrars. Success in the Punjab is partly due to the high education of the Assistant Registrars and their knowledge of the people and the fact that they were of the same race and the same sympathies as the cultivators. Here, we are obliged to use, for our superior Assistant Registrars, men who have excellent character and good natural intelligence but who have never had a general education in some cases above the seventh standard.

61791. Among the causes contributing to this decline in co-operation, was there any decline in the interest of the non-official organisers?—The non-official organisers rather failed us. The aim of the department as far back as the time of Mr. English and Mr. Clayton was to withdraw official propaganda and leave things to the non-official propagandists. We got help very often from the chairman of the rural societies. They were just cultivators with a bare knowledge of reading and writing. They would sometimes form societies in their neighbourhood and would instruct the members until they were tested by members of the Government staff. They did excellent work. That has stopped in recent years. The department was drawn off to other duties. We proposed to abandon official propaganda, as I say, and the village chairman was not supported by people of better education and did not get a lead, I suppose. It has stopped practically now. It is going on to a small extent in Lower Burma but the trouble in the country at present is the stopping of business in the dry zone districts. The failure of the societies occurred in these tracts where crops are precarious. These societies could not even pay their interest. So the Central Bank has stopped business with them and as no business was done they have ceased to be enthusiastic about forming new societies. When business was going on and loans were being given they could easily form new societies.

61792. I see that a remark is made in the annual report which seems to be characteristic of Provinces where the movement is declining, and that remark is that the Provincial Bank had a very successful year. Do you think that one of the causes of this decline was rather overstressing the central financing institutions and somewhat neglecting the primary societies?—I do not think so, not in Burma. I do not think the Registrar's attention has been too much given to the Central Banks. I think one notable thing that we have not done is this: (It has not been done anywhere in India yet.) The principle laid down by Mr. Wolff, for instance, is that the primary society ought to wean itself at an early stage from connection with Central Banks. Mr. Wolff uses the expression that a primary society in debt to the Central Bank is a society in hospital.

Mr. English made it one of his aims that primary societies should obtain local deposits. We made certain efforts during the War. We induced the Deputy Commissioners in some cases to assist us in getting villagers who could not afford to buy a post office cash certificate costing five rupees to invest in War Loans through the primary credit societies. We arranged to get sums smaller than that—in some cases two and three rupees. We arranged for these sums to be deposited in the co-operative societies as a sort of beginning of local deposits. But that has not been followed up. It has not led to any increase. When the time came for withdrawing these deposits, they were paid out and I think the decrease resulting from that repayment was some five lakhs or so. It has not been made good yet, or hardly. I do not think we have over-emphasised the central organisation. We have always realised that the village society is the main organ of co-operation and everything else is to be its instrument. The Central Banks are not owned by individual shareholders here. The majority of the shares, I think, in all cases are now owned by the societies. When they first start they generally have a certain number of individual shareholders but it is always arranged that societies shall dominate the share holding.

61793. One of the institutions peculiar to Burma was the guaranteeing unions. How were they functioning at the time of the decline of co-operation?—I should say badly.

61794. When you come to the point of calling up the guarantee, the guarantee is not forthcoming?—That is the difficulty. The guarantee was never really worked up as a commercial guarantee. It was relied on for moral effect. When you came to enforce it, all sorts of difficulties arose as to the date or point at which the union guarantee came into effect. It was maintained that it was only when you have squeezed the last anna out of the defaulting society that the union would become liable, and then when the union became liable it was uncertain whether the union and other societies must pay up in cash or whether they could merely give you an undertaking to pay the amount. These problems had to be tackled. The union guarantee was originally relied on for moral effect. It had a moral effect. We now want something more tangible in the way of security, or some security on ordinary commercial lines which will be realisable on default.

61795. I always refused to have anything to do with the guaranteeing unions. I went in for banking unions. You have seen a banking union?—Yes.

61796. Do you think they are better?—The guaranteeing unions themselves are vastly better than our central banking system. I think that a guaranteeing and supervising union, as it is called, has done good service in this country. I think its weak point is that it is not part of the banking system and our weak point is the lack of contact between the borrower and the lender, which your banking union seemed to me to secure very well, the banking union being managed by leading local persons who will have influence.

61797. Your guaranteeing unions had to recommend the loans and the banking union had actually to decide whether or not a loan should be given?—They are fundamentally different. That is important. The responsibility of the banking union is more direct. The supervising and guaranteeing union recommend a loan from somebody else's funds, which is quite a different thing. They recommend, for example, a loan from the funds of a bank in Mandalay which is many hundreds of miles away. It is quite a different thing from recommending or granting a loan from the funds of its own institution.

61798. The liability of a guaranteeing union to recover a loan which it has recommended is not quite so clear or definite as the liability of a banking union to recover a loan?—The guaranteeing union's functions as regards recovery are not definite. It is left in practice to the liquidator.

61799. You are not in favour of economic inquiries?—I should not like to say that in such broad terms.

61800. *Is your objection to the inquiry, as such, or is it due to the local difficulty?*—I do not condemn all economic inquiries. What I object

to is the conducting of an economic inquiry, simply because somebody wants to know. In every country statistics are of no use unless they are hammered out by criticism and by the opinions of clashing interests. The best and the most efficient statistics are produced like those that are produced in England for workmen's cost of living. They are produced by the best experts in the world. They are criticised by other experts. They are criticised by conflicting interests, by the employers and by the workmen who can command the services of other experts. They are also examined by the press and the public. We have not got that atmosphere here. We cannot work comprehensive economic statistics and it seems to me that we ought to confine ourselves to statistics that are likely to be of practical use. For instance, the statistics produced in revenue settlement inquiries have a definite practical end. We have experts of sorts who might produce them and in time we may get them criticised. That is the best chance for the production of statistics. I have had questionnaires from a clever young gentleman in Bombay asking me how many things of this kind and that there are in a village and so on. He is not prepared to use that information for anything and, if I answer it, I shall only be producing columns of insufficiently tested statistics which may be used for misleading the public or misleading the unfortunate persons who collect them.

61801. Mr. Darling's book on the Punjab peasant was not produced for any immediate practical purpose but you do not deprecate the kind of economic inquiry made there?—I should think not. In the Punjab you have a more favourable atmosphere for economic inquiries. The kind of people you have as Assistant Registrars are men capable of doing some criticism of that kind of work and you have got your Universities. We have our University but it was started quite recently. We have not enough graduates in the country, even graduates of a low standard, who have got the education to deal with statistics.

61802. On the question of the area cultivated by a cultivator, there is a table given in the report of the Census of India which shows that the average cultivated area per cultivator for Burma is 5.63 acres, that is, not counting his family or his labourers or farm-servants. That is certainly much lower than any figure which you have given in answer to Sir Thomas Middleton?—What is the good of a figure like that? You might have a figure for the whole of India but what use could one make of it? If you are going to have statistics of that sort it seems to me that you must have them by districts or even by smaller areas. How can you draw any conclusion, for instance, about the agriculture of the Pegu district or the Hanthawaddy district where, according to the settlement statistics, the average tenant's holding, that is to say, the holding of the man who is in charge of the cultivation, is seventy-five acres? That was some years ago and, in fact, comparison of previous reports indicates that there has been a continuous growth of the average area of these holdings, the tenant being very much like an English farmer with his own stock and cattle and with some managing ability, and with schemes for saving labour. You will find men in that district working their ploughmen in double shifts and paying high wages to them. As I say he is a man with some degree of ability. How can you, therefore, compare those conditions with the conditions obtaining in some parts of the north of Burma where the people live in a valley shut in by hills? These people will give you paddy if you can carry it over the hills on your shoulders, but you will not be able to carry more than one basket. They live partly on roots and their jungle produce. I should not like to say what the average holding is in the Katha district or in the Upper Chindwin. A man might get on quite comfortably on a very small holding of land. How can you draw any general conclusions with such variations as these?

61803. One obvious conclusion from that is that there must be round about a million cultivators in Burma living on five acres and less?—There is another point and that is as to who is a cultivator according to the census figures. Whenever I have tackled the Census Superintendent on the question of occupation figures he said that I could not draw any inference from their figures. Of course his results are dependent on the qualities of his enumerators who are not of a high standard. The enumerator gets the best instructions that Mr. Grantham can give him and we have had good Census Commissioners before Mr. Grantham. The general view held is, I think, that the figures of occupation are practically worthless.

61804. I think you were a member of the Committee which dealt with this Land Mortgage Bill?—Yes.

61805. The Bill seems to be rather elaborate?—Yes.

61806. Would you accept the principle that any measure which, it is intended, should be controlled by the people themselves should be of a very simple nature?—I discussed that point with Mr. Grantham himself. He admits that the Bill, and still more the rules he is going to bring out are beyond the comprehension not only of the ordinary cultivator but also of the ordinary Indian civilian. He thinks that managers will understand and they will, no doubt. All that a cultivator will understand is that he is going to get the money and somebody is liable for it, and that he can repay in so many instalments, and when he has repaid the money he is free of the loan. There are certain fundamental points which are all that the customer need know. I think there is something to be said for this view because the ordinary European depositor does not really understand how a bank is run. He deposits money with the confidence arising from the fact that people who do understand are also putting their money in.

61807. Would you accept the principle that, in any association, it is very essential that the liability should be clearly defined?—Yes; there are certain points that the customer must understand, just as a depositor in an English bank must understand some points about his pass book.

61808. Do you think that any borrower under this Bill would ever know what his liability was?—I am not quite sure about that, but Mr. Grantham thought so. If we bring it in at all, my opinion is that we should try to make it understood. I admit that there are certain points in the liability about which I did not agree with Mr. Grantham, and there again he trusted, as we did with our union guarantee, to a moral effect. For instance, he wanted to make every borrower under his scheme liable for default of the National Mortgage Board of which, of course, he (the borrower) would know nothing. I do not suppose his idea was really to make an innocent cultivator pay up, but to make him feel that he was a member of a great business.

61809. Actually, every borrower has to contribute to the guarantee of bonds; he has to contribute to the default of every bank, and he has to contribute to liquidation?—Most of the borrower's liabilities are to be met by what he calls, I think, the guarantee fund, which is a sort of reserve fund, and this is drawn upon before anything touches the borrower's pocket directly.

61810. That surely has got to come into existence first, whereas the borrower is there from the start?—Yes, it is to be presumed that nothing will go wrong during the first year or so and that the reserves would be built up as rapidly as possible.

61811. Do you think that there are really, in Burma, a considerable number of indebted landowners who are really prepared to make a fifteen or twenty years' continuous effort to repay their debts?—I do not think that it would be a conscious effort, but if you offer them business with the land mortgage bank in which you have to pay annually to the bank, say, sixteen per cent which includes amortization, so that in twenty-five years or less his debt is cleared, he would naturally accept that in preference to dealing with a *chetty* or other private moneylender and paying the latter, for interest alone, 18 or 24 or 36 per cent per annum. The idea is that the mortgage banks will beat the *chetty* to the extent that they will be able to offer terms by which the interest *plus* principal repayment will not exceed the annual payment towards the interest on loan which borrowers have to pay to private moneylenders, including not only the *chetties* who are the cream of the business, but also the other middlemen in the business who will charge much higher rates and are much more dangerous to the cultivators.

61812. You would find, in Burma, men who are prepared to undertake the liability of some crores of rupees on bonds which they never see, responsibility for banks in other districts than their own, responsibility to repay their own debts in fifteen or twenty years, liability to pay the debt over again? Will you find many men in Burma who will undertake all this?—If you begin to talk about responsibilities like that, they will run

away no doubt, but they will not really understand it. I think it is quite possible that the bank might get to work if you drew up simple instructions such as Mr. Grantham proposed to draw up. I must say that I myself did not agree with him about making individuals directly liable for the defaults of the Central National Board. It is not worth trying to have a moral effect of that sort.

61813. *Dr. Hyder:* You said in your examination that you were a member of the committee which examined the provisions of this National Mortgage Bill. I find from the papers that the two noticeable features of the banks to be established under the provisions of this Bill are independent management and joint guarantee. Are these not the two noticeable features?—Yes, there is certain amount of independence of management but they are under rather tight control by the Central Board.

61814. That is precisely the point. Mr. Calvert has been questioning you about this joint guarantee and you see yourself the difficulty that a man living in the Delta Division might be called upon to pay for the misdeeds of men living in the most northern districts of Burma?—I do not think that is really contemplated by Mr. Grantham.

61815. We want to understand the position. We want to know your own opinion about the phrase used here, namely, 'independence in management.' You have, I presume, branches of the Imperial Bank here?—There are the district banks in the proposed system under the Central Board.

61816. And you know yourself that, in banking, this local autonomy or independence is a vanishing factor in other countries?—I know that in some countries there has been a tendency towards consolidation of banks.

61817. So that very little would be left of this independent management which Mr. Grantham has put down in words?—The independence is limited.

61818. Have you not got a Central Board to raise the money and to see to it that there is not much room left for independent action?—I think Mr. Grantham relied on the Central Board consisting of far-sighted and enlightened people who would look to the interests of the land mortgage system, and who would also see that, if they tied the district banks too tightly, the system as designed would not work. The district banks would certainly have a certain sense of responsibility. It is a matter of the discretion of the board in their management.

61819. So that the board would have to choose between these two matters, as to how far to let them act independently and how far to control them in the interests of the whole system?—Yes; it would rest with the board.

61820. So that the expression 'independence in management' is a mere matter of words?—Well, it is a guidance to the board to indicate what the intention of the system is.

61821. In this Province, the spending of the family income is chiefly in the hands of the women of the household?—I should say the women have a good share, but I should not like to say that it is chiefly in the hands of women. I think the women do not go to the races so much as the men, or take part in gambling or in drink. In business affairs women are consulted a good deal, but I think it would be an exaggeration to say that most of the expenditure is in the hands of women.

61822. Most of the family expenditure on food, etcetera, in short, household expenditure, is in the control of the women of the Province?—Not exclusively. The Burman married couple are in fairly equal partnership; the man breaks down if his wife is ill; the wife looks after the domestic side.

61823. The woman has a very large voice in this Province?—Yes.

61824. Do you think you can make a success of the co-operative movement unless you take the wives also into the co-operative movement?—We have heard that criticism many times, and we have not ignored it. There are co-operative societies exclusively consisting of women; the societies will admit women quite freely; in fact, we go according to local public opinion in the matter; there is no attempt to exclude women; there have been certain attempts to start special societies for women, and women naturally do take part, as they do in other business, in co-operative societies.

61825. Are they enrolled as members of societies in which men are enrolled?—Yes; there are women members, but not very many because it is not the custom.

61826. Is that a line of advance in your opinion, which promises success?—I do not think it wants any more forcing than we have given to it. As I say, there is no attempt to exclude women, and women in Burma take their own place; they do not want helping.

61827. You say that the provisions of the Civil Procedure Code are a dead letter. Are the provisions relating to imprisonment for debt also a dead letter in Burma?—I do not know that they are. I am not quite sure what the position is about that legislation at the moment.

61828. If a man does not pay his debt, the creditor can send him to the jail?—If he is recalcitrant, he can be sent to the civil jail?

61829. Yes?—I do not say the judges break the law.

61830. Do you think that this provision should remain or should be abolished?—You mean imprisonment for debt?

61831. Yes?—I should abolish imprisonment for debt.

61832. You have held charge of districts; have you not?—I have held charge of one district as Deputy Commissioner.

61833. I do not know whether you would be prepared to answer a question as regards the effect of yearly tenancy on the improvement of agriculture generally?—I can only tell you what my experience has been in the Co-operative Department. We have a number of co-operative societies, containing tenants, in some cases consisting exclusively of tenants. I have toured in the districts. I think Mr. McKerral told you yesterday that in some of the southern districts the yearly tenant was reluctant to use manure. I know that myself for a fact as to parts of the Pegu district. If you ask a tenant cultivator in those parts why he does not put manure into a soil which will repay manuring, he will himself tell you that it belongs to an owner who frequently changes his tenants and that it may not be cultivated next year by him, and therefore he is not going to put on cattle manure which will benefit somebody else.

61834. If the tenants were given the right to compensation for unexhausted improvements, do you think that would have a beneficial effect on agriculture in Burma?—I think it might in the long run. But to work these things is rather difficult. You might have a law introduced and nobody may know it for a long time. The country is so uneducated that it would take the tenants a long time to understand it if you gave them the right to recover compensation for improvements. I think it ought to be done; we ought to make that reform. Mr. Couper proposed it in his report on the condition of tenants and agricultural labourers. I think it is a very important reform.

61835. As regards the method of local self-government in Burma, could you not proceed on the old lines; that is to say, associate the village headman with the machinery of local self-government? Has the village headman any place in your local self-government?—Like most of our local self-government arrangements, he has, on paper. The old Village Act was amended in 1924 to provide for the creation of the village committee of which the chairman was to be the headman of the village. Under the Village Act, the functions of the village committee are largely police, judicial and magisterial. At the same time the Government have amended the Local Self-Government Act so as to make the same village committee a subordinate local self-government body for performing the functions assigned to it by other local self-government bodies. The district council has below it the circle boards and the circle boards below them the village committees. The district council is the only body which has powers given to it by the law, with the single exception of the power of electing which the circle boards have. The district councils can delegate any or all of their powers to the circle boards and the circle boards can delegate any or all of their powers to village committees. Since the Act of 1924 was passed, village committees have been formed by the District Officers in a very large proportion of villages; a certain number of villages are exempted from the operation of the Act. You see we have a village committee now constituted, but it is not operating except on the police side, where it is said to be doing useful work already.

61836. In other Provinces, we associate with the co-operative movement the village school teacher; in other countries the village school teacher and the village priest. In your Province, do the priests wash their hands of all mundane affairs or do they take interest in the co-operative movement? —It is rather difficult to say; they certainly have not given much help to the co-operative movement as inaugurated by the Government. But, in recent years, the monks in certain districts started societies which were not registered under the Act and which were given a name very similar to the Burman name for co-operative societies, and which aimed at collecting savings and lending out loans. Obviously the idea was borrowed from the co-operative societies instituted by Government. Some of these societies met with considerable success, but I do not know how they are getting on now. They collected surprisingly large sums in local deposits.

61837. *Professor Gangulee:* Why were they not registered under the Act?—Because they did not want to register. The Buddhist monks are not generally in very good humour with the Government. They were encouraged in every reasonable way. I think they were not altogether unfriendly. They collected local deposits (that was a very good public service), and they were sufficiently friendly to have the deposits invested through the registered societies. They were told that there were advantages in registration under the Act and that they would not be molested if they liked to register.

61838. *Dr. Hyder:* The cultivator in Burma does a certain amount of carting, does he not?—In the industrialised area of agriculture, the agricultural labourers (not the tenants or landlords) who own their cattle take the work of carting on contract. That is the practice in the area of industrialised agriculture. In other places anybody who has got cart and cattle will earn money by carting if he can.

61839. Is that so in Upper Burma?—Yes.

61840. Is this occupation losing ground owing to the competition of railways and motor cars?—I have not heard that the competition of railways and motor cars has had that effect. Motor cars are spreading everywhere, but I have not heard that that has affected the income of the cultivators from carting. I suppose as we improve the road communications and improve the railways, traffic generally will increase, not only motor traffic, but cart traffic too. The motor car will handle the traffic more quickly, but the cart will still be wanted for service where the motor car cannot go.

61841. Are any lorries owned by people living in the rural areas (cultivated areas)?—I think there is a great number of lorries running on the Public Works Department roads. I do not know whether they are owned by cultivators, but they will be owned by people who own land, at any rate by people who live in rural areas.

61842. Are you in favour of a system of licensing ferries, or would you throw them open?—If we throw them open, it will be a heavy loss to district councils. But it is desirable to throw them open. Paying the ferry tolls is rather an oppressive tax on the poorest part of the population. I hope to see that we shall get bridges in time; the ferry fee is a thing that the country will have to grow out of.

61843. *Mr. Reynolds:* You drew rather a gloomy picture of the progress of the co-operative movement in this Province?—I do not feel gloomy about it at all. I do not myself think that it will come to grief.

61844. I gathered that there has been a long period of continuity of administration, that this period of continuity of administration has been accompanied by an increase in the societies, that, recently, continuity in administration has broken down, and that that has coincided with a definite check to the movement?—I do not think it coincided. The rate of increase was slowing down before the old hands in the Registrar's appointment left it. The policy of the department, as I mentioned just now, was to withdraw official propaganda, and I think that the place of official propaganda was not sufficiently filled by non-official propaganda.

61845. I see that the reports of the three years ending in 1921, 1922 and 1923 were signed by you, and that for the next year was signed by Mr. Couper, but I think he was included by you as one of the officers who had long experience?—Yes.

61846. I see that the reports of the next two years were signed by Mr. Steavenson, and that in three previous years Mr. Steavenson had been Joint Registrar?—Yes.

61847. So that you could include him among officers who had long experience, as experience goes in this country?—I think he had been Joint Registrar for broken periods. I think he told me himself that the unfamiliar routine was rather oppressive to him.

61848. He worked in the department, off and on, for four years before he took it over?—The continuity period was much less. I think he joined the department at various intervals.

61849. So that there was some continuity up to the year for which the last report is published, the year ending 1926?—I should say what I stated before. I did not regard Mr. Steavenson, when he came to the Co-operative Department, as one of the old hands. He was in charge for three years, and by the end of that time he came to know something about it.

61850. In the year ending June 1920, the increase was big, twenty-four per cent ; the increase had been very rapid up to that point. The next year the increase falls to eleven-and-a-half per cent, and the report is still signed by you. The next year the increase fell to eight-and-a-half per cent, the next year to three-and-a-half per cent, still in your time as Registrar. The next year, with Mr. Cooper as the Registrar the increase is one per cent, a further fall of two per cent only. But the big check to the movement appears to come in the last three years of your Registrarship; between 1919-20 and 1923-24; from an increase of twenty-four per cent, it came to practically nothing?—Which was the first?

61851. Beginning from 1920. The fall was in the next year?—That is the year after the War.

61852. So that the big check came before there was any break in the continuity of administration?—I do not think I am astonished at that. The decrease in growth was, I say, due to the decision of the department to leave propaganda to unofficial agency. I think up till that date, the union chairmen were forming new societies rapidly.

61853. The report for the year 1921-22 is the first report to refer to what are called separate tendencies, which was in fact political agitation against the department?—I do not remember the reference to it.

61854. Both in that year and in the succeeding year there is a reference to attempts to start non-Government societies. There was an agitation against any co-operation with Government, and that was the period when there was much non-co-operation in Burma, 1920-21 and 1921-22?—I should think that is the date.

61855. One might say they were years of agitation?—Yes.

61856. It was when political agitation reached its height?—Yes.

61857. Would you not attribute the pronounced check to the increase in societies in part to this agitation, which coincides with that?—I do not know; it was part of the general situation. At any rate, I never attributed the check in expansion to agitation. You have got the societies formed by the monks. The members of the earliest of those societies were actually members of the co-operative societies. The societies formed by monks were numerous in Tharrawaddy, but it was not clear that there was any great opposition to the registered societies. In fact, the fear rather was that the co-operative societies might be captured by the nationalist associations. I do not think the department was aware of any great difficulty in connection with that.

61858. I understood you to say, in answer to a question, that you considered the policy of winding up societies which were in a bad way was a policy of doubtful wisdom?—I do not think I said exactly that. You have got to consider each case on its merits. Winding up is a measure that you should adopt only after due consideration. You could not talk about a general policy of winding up co-operative societies any more than you could talk about the policy of winding up joint stock banks. It may be necessary to wind up the Alliance Bank, or it may be possible to make some other arrangement and carry over a crisis. I do not think one can talk about the policy of winding up. There are obvious grounds on which you may have to wind up the Alliance Bank, but there are also grounds on which it is

wise policy to keep it going, or to amalgamate it with some other bank, and so on. I do not like these generalisations about the policy of winding up wholesale, or any winding up. I think I have mentioned that there were officers in the department who thought that a co-operative society ought never to be wound up. I do not think experienced people would talk in generalities like that. There has been, in fact, some change in the attitude of the department towards winding up societies which are in a bad way. There was a tendency to think that a society should never be wound up. In recent times the Registrars are rather inclined to the view that where a society has failed to pay for four years or so, the only thing for it is to wind it up. But I do not think that the Registrar who is supposed to have taken that view would not consider each case on its merits. If he knew enough about it, he would be able to decide whether reorganisation should be tried instead of dissolution.

61859. I find that in the report for the year ending June 1924, the repayments by societies to banks in two Upper Burma districts were roughly nine and seven per cent each, annually. Can the Central Banks hope to continue doing business with societies where repayments have fallen to, and stayed at about, that rate?—I do not think the Provincial Bank hopes to do so, or does it. When a society does not repay, it is not so foolishly managed as to go on lending to the society. Business in certain districts is now simply at a standstill, because societies have no more credit, and they are not repaying. I do not think the Provincial Bank hopes to do any more business with them. In fact, the point is now under discussion as to whether the Provincial Bank should not withdraw its business altogether, and cease to deal direct with these primary societies in districts which are distant from the bank itself.

61860. Does not that mean that the stage has been reached when some attempt at liquidation must be made?—Certainly. You would have to consider each case on its merits. You cannot make a sweeping generalisation as regards all these societies. I understand that the policy is that the present Registrar is to form district or township banks, possibly something on the model of the Punjab banking unions, and form new local banks on the basis of such good societies as there are. I am afraid I am going into details now, but the policy is that the Provincial Bank should cease to do business direct with primary societies; the general idea is to get closer relations between the borrower and the lender. In the case of these apparently hopeless societies, it is thought that if the department goes round now, and tries to restore things by securing repayment of a reasonable amount of the Provincial Bank's loans, the societies may be put into working condition, sufficiently good to be decent customers afterwards of local banks, which will know about them, and will be able to have somebody on the spot at the time of the harvest to take the money. The trouble about repayment, I think, has been largely the fact that there was no bill collector, and that the arrangements of the banks for facilitating repayment have not been quite good enough. Repayments are a troublesome business. There is nobody on the spot to facilitate and encourage repayment. I think that the failure is not due to any particular wickedness of the cultivator, but rather to the lack of adaptability and cleverness in the methods of the co-operative banks and societies.

61861. *The Raja of Parlakimedi:* How would you put the agricultural indebtedness of Burma as compared with the conditions in India generally?—Do you mean, is it greater or smaller?

61862. Yes?—I am afraid I could not tell you at all; I do not know what the total is. I suppose the amount of money invested in agriculture differs enormously in different Provinces; I could not compare. I should be very reluctant to say anything about Burma as a whole—the conditions differ so enormously. There are parts of the country where the farming is subistence farming and people simply farm for their food. The most important part of Burma commercially is based entirely on the export trade and cultivation has taken the form of the rice factory, highly organised, with division of labour and with capital arranged for in a similar way. It is impossible, I think, to answer your question.

61863. In what part of Burma are the people heavily indebted? Is it in the dry or the wet area?—Of course, in the areas of subsistence farming, of which I was speaking just now, there is practically no indebtedness; in

actual amount of rupees it is negligible. The amount of money invested in agricultural credit is no doubt much the greatest in this industrialised area in the south round the ports. It comes to vast sums; you can judge that from the number of offices of the *chetties*. The *chetties* do a vast amount of business in the richer export areas. You can take it as an indication of the amount of indebtedness. In the dry zone the *chetties* are less numerous and do a far less amount of business. I suppose indebtedness is greatest in the richest parts. Perhaps you mean, in what part of the country are people feeling their debts most at the moment?

61864. Yes, where are they being harassed most and where are the rates unnecessarily high?—I suppose the rates are too high everywhere. Better business will eliminate the number of middlemen and produce cheaper credit gradually in the long run; but, taking conditions as they are, I do not think the amount of excessive rates of interest due to avarice or wickedness of that kind is at all important; there is too much free trade and too much coming and going in Burma for that. There is no question of what I suppose might happen in a backward part of India; a rich village *bania* having some semi-slaves entirely in his control; those days are gone. There is competition; no *chetty* has an exclusive hold on his clients. There was something of the nature of what perhaps, you are thinking of, for instance, in the weaving industry in Amarapura some years ago; the employers there ground their workmen pretty hard through debt. I think that has disappeared now, and that is due largely to competition and more capital coming into the business; there are other people setting up small factories who employ these people and the Government has intervened to a certain extent by starting co-operative societies of weavers. A number of factors have intervened gradually to remove that old condition; I do not think it exists now to any important extent: of any local moneylender having a power more or less comparable to the feudal power of a baron in the old days. You will hear of pressure of debt where people are doing badly in business; they cannot meet their debts and there are liquidations going on, as there might be in manufacture or anything else.

61865. Among the actual cultivators, are a considerable percentage in debt?—Yes, a very great proportion of them have debts.

61866. What is the reason? This is a very fertile country?—Because they are rich; if you are rich you want to spend your money, so why should not you use your credit as well as your capital; that is the idea. They do just the same as a trader or manufacturer will do. If a man has got property which will produce him fresh capital by means of credit, he will use all the capital resources he has if he has an opportunity of development. There may be cases where there is not any real possibility of development, where he will use his credit as well as his capital to raise his standard of living; but, in that case, he will probably drop down in the scale of society; he will drop from being a landowner to being a tenant or from being a tenant to being a labourer. That is going on. I take it that is generally due to the fact that the man uses his credit to raise or maintain his standard of living instead of using it, as Mr. Henry Ford would, to extend his business. In many parts of the country a cultivator has no openings for extending his business.

61867. Have there been many instances, recently, of people dropping in the social scale?—It is going on continually, as far as I can see. As far as one can tell from the settlement reports. The average tenant's holding in parts of the Pegu district is seventy-five acres; if you look at the reports a few years back you will find it was fifty-five acres or something like that, and a few years before that you will find it was, say, forty. There is an indication that the tenants are becoming bigger and bigger men, the rest of the population gradually becoming a labouring population more or less stratified, some of them with a little property, owning their cattle and so on, some of them just unskilled labourers. The highly skilled agricultural labourer is worth a great deal more than an unskilled man. There are ploughmen earning different rates, according to their skill. The population is becoming stratified and graded, just as you have the people graded in an industry, in a factory.

61868. In such circumstances, would you not be in favour of some legislation to ensure at least a percentage of the holding to the actual landowner?—But that, it seems to me, would not be practicable; you

could not defeat the economic tendency unless you, at the same time, fortified the small uneconomic holder by combination; if you gave him a co-operative organisation for supply, distribution and manufacture of his goods for the market, put him in fact in the position of the capitalist producer, you could then possibly carry on with your smaller holding; but he would have to submit to a great many restrictions on his liberty for the sake of holding this position. I do not think you could enforce that by law. It is only if there were a sufficiently large class of small holders who were fighting for their position, and sufficiently educated to see how to do it, that you could work things of that sort. I do not think legislation is capable of producing those results.

61869. Supposing there were legislation preventing a man from pledging his land to borrow money, an Act such as there is in Madras preventing a zamindar from borrowing money upon his estate except on movable property, or something in a somewhat modified form to ensure the landowner of this country at least a portion of his holding?—The Bolshevists were not able to do things like that with the cultivators and I do not think we could do it either. The Bolshevists have got a strong hand, of course, after the revolution, but what you suggest would be an enormous revolution here. It is not only the foreign *chetties* who are concerned; the people who have money invested in land are all classes of the population, or at least those who have got money so invested includes Burmans, Karens, Chinese, Europeans and Indians. It is not a question of turning out a small class. The point is that this industrialised agriculture is firmly seated; if you are going to go back, destroy this present method of obtaining capital and try to make a general division of the land in small holdings, it will be attempting to do something which, as I say, the Bolshevists have failed to do.

61870. My idea is to protect these old families of Burmans and provide them with land?—Of course, Lower Burma is not an old country and I think you may say there are no old families in Lower Burma. Lower Burma was made by emigration from Upper Burma in recent years, since the opening of the Suez Canal, when the export trade began; that was the beginning of Lower Burma; so that there are no old families. The country is not aristocratically organised in that way. Even in Upper Burma, the old families attached to the land do not exist; people will sell their land with the greatest readiness and treat it as the family of a manufacturer would treat his plant and machinery, sell it if they get a good price. That is not my own opinion only. You will find it in reports of revenue officers for many years back.

61871. You say that the Usurious Loans Act is a dead letter among the people. Would it help if they had these Acts translated into the vernacular?—I think they are translated already. The translation is not very intelligible to the ordinary reader but it is translated by the best instruments we have. We have got a special Translation Department; but, there again, the work, like statistics, wants continual criticism and use. The men in the Translation Department are members of the Subordinate Civil Service; they are put on to translate a legislative enactment dealing with economics or debt and so on: they are not specialists in it, and what they produce is much more difficult to read than the English itself, and, of course, the English puzzles most of us. It is very difficult to get the provisions known. The Co-operative Department has printed a vernacular leaflet describing the provisions of the law for the protection of the cultivator from harassment by debtors; that leaflet has been printed in Burmese and distributed to all the societies, but people do not read leaflets. Our people explain them to a certain extent, but I think if you called up the members of the Co-operative Department now you would probably find they would do very badly in an examination on it.

61872. These translated copies are available?—Yes.

61873. In all centres I suppose?—I will not undertake to say that; they were issued some years ago; probably there has been no re-issue since; I do not know; but it is printed in the handbook of the department.

61874. Is it the present tendency to refer to the Acts more than in the past?—I could not say, but the country is getting its education slowly. I think probably the township judges nowadays are better educated than

they were. I have not been in the department for three years; there may have been cases since my time when a township judge has actually enforced the provisions of the Civil Procedure Code; I could not say.

61875. Do you think the harassment has decreased?—I should think it is probably decreasing because the cultivator has got wiser all round. It has not been due to these Acts; he is a better business man; there is more competition in moneylending and in everything else. Pawnshops have developed enormously. There are poor men's banks. They have been developed to a remarkable degree not only in the big towns but also in the country towns. That is an alternative resource. I do not know whether you get it in India at all. The revenue from the licence fees alone is large.

61876. Among the moneylenders, whom do you consider the worst class, so far as rates of interest and insisting on repayment and so on, are concerned?—I do not like to say that there is any wickedness in any of them. They are quite as decent people as myself.

61877. I am asking particularly with reference to the question of showing latitude in the recovery of payments?—The smaller the middleman the bigger the rates will be. The *chetties* who have the cream of the business have taught the Burmans a great deal in business methods. They have taught the Burmans how to mortgage their lands. They have taught them the use of more or less legal forms of documents and taught them regular business methods. The country owes an enormous amount to the *chetties*. They get the money either direct from the chettiar firms or (mainly) from the Imperial Bank and some of the other banks. They lend on the security of land only to the very biggest cultivators, and to landowners who are acting as middlemen. Burmans and Karens and others take money from the *chetties* at twelve per cent per annum, or fifteen per cent per annum and will lend it, relying on their own knowledge of persons, which the *chetty* knows he has not got, to smaller men. The *chetty* will deal with people in a limited area, with people whose characters and security he understands. The Burmans will lend again at considerably higher rates and so you get down to the cultivator, and the cultivator's expression with which I am familiar in the dry part of Burma is what they call *bhamado* which means Burman interest. The rate of interest increases with every additional middleman who enters into the bargain until, in the end, you find *bhamado* as much as fifty and sixty per cent, being charged for twelve months. That is the rate at which the lowest grade of middleman lends. It is only the man with better security who can get lower rates. There is no wickedness anywhere in this. The last middleman may be a perfectly honest dealer. He borrows his money at high rates because his security is very bad. He takes risks, and naturally he has to charge a high rate.

61878. *Sir James MacKenna:* With reference to this question of the *bhamado* that you mentioned, have you come across any cases where the demand was limited to the principal, *plus* an accumulated rate of interest of equal amount?—That is an old saying. I think it has a moral effect only. I do not think I have come across, anywhere, any instance where it was actually recognised.

61879. The idea exists?—Yes.

61880. I do not think I have come across any cases myself?—I have not seen any practical case of that kind.

61881. I think the Burma Central Bank issues loans through district banks and to primary societies directly. On whose authority are advances made?—Formally the authority is the manager. He had the power to make loans by delegation from the committee, but, in practice, the manager relies upon what is called the maximum borrowing limit fixed by the Registrar. That is for loans to the primary societies. For the loans to the district banks, he does it on his own judgment.

61882. Has the Provincial Bank power to inspect?—No legal power. It can insist on inspection in the conditions of the loan, if it likes but in practice it does not inspect. When it is dealing with primary societies, it relies entirely on the Registrar's maximum borrowing limit.

61883. How are the colonisation schemes getting on?—I have not been in touch with them for several years. Formerly they were started by the

Co-operative Department. I was employed on them when I first joined the department in the Minbu district on the canals and have been employed a good deal on the later colonies on the Sittang. Then, about 1922, I think, Government decided to form a separate department for colonisation and they have since changed the title to Government Estates Department; the idea connected with the change of name was that the colony should thenceforth pay its own way. When we were managing it they got the service of the Co-operative Department free. The society got loans from Government at the ordinary rates for *taccavi* loans, which was very low. Government have raised these rates since and the idea now is that the Administrator of Government Estates should act as a good landlord, a model landlord, and that the tenants should be just ordinary tenants and not specially favoured. The original colonies, the earliest ones at Minbu are doing well. So far as I have heard, the first colonists in Minbu district are generally still in possession of their land. They left the co-operative credit societies in some cases because a good man, as soon as he had paid off his debt, cleared out because he did not like his liability for the weaker brethren. Still, co-operation in that district is doing fairly well. They have got a co-operative rice mill. It is doing quite creditably. Although the urgent need for credit has gone, they are doing something else in the co-operative line, which in my opinion is a hopeful sign. The next colony was in the Sittang area. It was the second set of colonies and is situated in the industrialised area of agriculture. The loans ran to quite large sums per head. I think I am right in saying that it was as much as Rs. 1,500 or Rs. 2,000 a head sometimes. They started with Government loans and I think they have paid them off very satisfactorily. I think the earliest colonists of all are quite clear of Government loans and the others are on the road to being clear, and they are accumulating large reserve funds in their societies and have formed a central union. Financially, they have done very well. The selection of men has been a great problem. On the whole they have been a success and the Colonisation Department, or the Government Estates Department, is going on now on the lines of a model landlord.

61884. What about co-operative societies in the Government Estates?—I do not know. They are not going to make a speciality of co-operation. I suppose that a progressive administrator, like a progressive landlord will do so. He has instructions to be a model landlord in every respect. He has to look after many other things, such as development of communications, schools and so on.

61885. *Professor Gangulee:* You have a special officer in charge of the Government Estates Department?—There are several of them now.

61886. In settling these colonies, what principle do you follow? Do you sell the land outright?—The land is leased out. They are tenants.

61887. Who decides the applications of the colonists?—The man in charge of the scheme was an officer of the Co-operative Department. He selected the colonists and we used originally to give a lease of an area as big as a village tract to one society, after getting the society formed first. But now they do not form societies and they are leasing direct to individuals.

61888. Your idea is to make the colonists ideal landlords?—The department concerned will be a model landlord.

61889. Do you have any demonstration farm in the estates?—That is not laid down, but in point of fact they have taken up a piece of land in the Sittang colonies for seed multiplication, and they will no doubt do it in other areas.

61890. I suppose you also control, to a certain extent, the housing of these colonists?—We do not control it. When the co-operative societies were there, they could borrow for housing. How that matter is being treated by the Government Estates Department I could not say. It is not in my control now. The Administrator of Government Estates has general instructions, the gist of which is that he should be a good landlord, and the answers to your other questions on this subject are included in this.

61891. Do the colonists congregate in one place and make a village?—Under the regulations they are liable to be required to live in a village, as they would otherwise offer an easy prey to dacoits. The general practice is that people are not allowed to live on their lands. That subject is being

discussed. Several officers have recommended very strongly that homesteads on the cultivator's land should be encouraged. Mr. McKerral is one of them.

61892. Turning to the co-operative movement, would you agree that frequent changes of Registrar may be one of the reasons for the present state of affairs?—I think that is one of the many reasons.

61893. Will you tell us something more about the training of the subordinate officials of the Co-operative Department?—That has been altered since my time. It is still kept up to a certain extent with modifications. The man was recruited in various ways, very much in the same way as officers of the Subordinate Civil Service are recruited. When he joined the Co-operative Department, he was generally attached to a senior officer to tour and in the course of his first year he was given a course of instruction in accountancy and a course of lectures in Co-operative Law. Before he was confirmed he was expected to be satisfactory in that. The department was not satisfied with this preliminary course of training and there was an annual refresher course. All officers were expected to attend and lectures were given by the senior and, in some cases, by the junior men; at the end of the course there was an examination.

61894. Are they required to go through a departmental examination?—Yes. In those days it was not prescribed by Government; it was done by the Registrars, Mr. Clayton and Mr. English instituted this purely as their own arrangement.

61895. It was not obligatory?—The Registrar required it, so that nobody avoided it.

61896. Is there any non-official organisation in the country to which you could look to for any efforts towards the re-vitalisation of your co-operative movement?—There is no private organisation that attempts to do that kind of thing at present.

61897. There is no such thing as, for instance, we had in Bombay, non-officials carrying on propaganda?—We have what we call the Provincial Co-operative Council, which is something in the nature of a central institute just as in Bombay, but it has not developed quite to that extent. In fact, it is now rather in a faint condition. I mentioned before that Burma is not so advanced as other Provinces. We have not had a University for very long as we have not had a very large public interest in things of that kind.

61898. But the co-operative movement is now about twenty years old, and within these twenty years you have not been able to arouse as much interest as would create even one non-official agency to which you could look for the revival of that movement?—I mentioned one co-operative agency, but recruitment to it is difficult, for the University must be given time to turn out a literate population, which you no doubt have been manufacturing for many years in Bengal.

61899. You consider that one officer, such as a Development Commissioner or Financial Commissioner, is necessary for correlation between the various departments. I have not been able to follow your idea as to how this co-ordination could be achieved. You told us that the arrangement at the present time is not quite sufficient?—Do you mean that you want a suggestion from me as to the way in which this co-ordination could be improved?

61900. Yes?—I do not think I can answer that offhand. I think we shall have to proceed tentatively. An *a priori* scheme would be very likely to fail, even with a man who knows the conditions in Burma. Even such a man would have to proceed tentatively. There are two methods: one by having a single control under one head, and the other control by means of a board in consultation.

61901. Do the Ministers in charge of the Transferred Subjects also feel the necessity of having such an agency for correlating the various departments?—I think that the Hon'ble Ministers are quite aware of the general principle and the need for correlation.

61902. I find that Mr. Couper, your predecessor, submitted a table showing the number of acres held by agriculturists. I want to know whether these people are cultivating owners?—I suppose you want to know the definition of 'agriculturists'?

61903. I want to know whether they are agriculturists?—I am not sure what definition Mr. Couper gave there, but the common definition adopted by the Revenue Department for agriculturist is, I think, a resident agriculturist. A man living close to his land, in fact near enough to be actually an overseer of it or supervisor, would be regarded as a resident agriculturist. But one who lived, say, a day's journey from his land, would not be counted as an agriculturist. I think that Government has never prescribed a definition. Different definitions have been adopted for different purposes in regard to the expression 'agriculturist.'

61904. Then he says 'occupied by non-agriculturists.' Who are they?—They would be people who do not live near the land and do not take an active part, either with their hands or with their eyes, do not assume supervision in the cultivation. Landowners would, for instance, be included among non-agriculturists, if they are merely landowners living hundreds of miles away. There are no agricultural tribes here.

61905. As many as 497,000 acres were transferred by sale, in the year 1925-26, in Lower Burma. Could you give us some idea of the approximate value of an acre of land in Lower Burma?—It is a sliding scale. With a certain amount of lag, I think the price of land in the areas of industrialised agriculture follows the price of paddy; in other words it is governed by the export trade. The price of paddy has been going up.

61906. You say on page 25 *: "Unfortunately investment of capital in new lands is handicapped by the uncertain tenure and restriction on alienation of such lands." Could you amplify that?—In Lower Burma vacant land can be taken up by a cultivator. He has no alienable rights, that is to say, he has no right to sell or mortgage it until he has got what is called a landholder's right. Until that time he has no right to alienate and Government presumably can interfere and lease it to somebody else.

61907. While on the subject of land tenure, I might refer to the note which has been given to us by the Director of Agriculture. He says that so long as the tenant has no security of tenure for more than a year, so long will the efforts of the Agricultural Department be shorn of much of their effect. Do you agree with that statement?—I have already answered, more or less on that subject, that the cultivator is handicapped by the annual tenure where he is actually evicted as is frequently the case in Burma. There is no settled tendency here, as there is in England, for an annual tenancy to become a permanent one. There is pretty keen competition between tenants.

61908. In regard to the Village Act, Mr. Couper, your predecessor, has given us a note and he says that the primary need is a revision of the Village Act. He then goes on to explain why he thinks so. Do you think it is really a necessity now to revise that Act?—I am afraid I cannot answer immediately, without looking at the Act to see whether verbal alterations are necessary. But I should think that it would be desirable, from the point of view of agriculture, to relax the police restrictions which compel people to live in the villages. I agree with Mr. McKerral and other people who advocate the encouragement of homesteads on the land.

61909. In your own note you suggest a system of registration. What were the circumstances that led to the proposal for introducing a system such as the Torrens system in Australia?—That rose out of the early discussions of land mortgage credit arrangements.

61910. Why was the proposal abandoned?—It is rather difficult to answer that question briefly. The Torrens system is one of the leading systems. It is an Australian system but it is based on Australian conditions, which we have not got here. It has been before the Government and they have not felt prepared to make the effort, which must necessarily be a very great one. We should have to get a system of registration of title, in place of the present system of registration of deeds only. The Torrens system involves an elaborate system of insurance against mistakes. In Australia, if there is a mistake, there is a general insurance fund out of which the persons injured by the mistake could be indemnified. It is too big an undertaking and Government could not tackle it.

* A Collection of Papers written by Government Officials for the Commission—Not re-printed.

61911. I want to ask you a question about the Rural Self-Government Act. What are the real functions of the circle boards?—First of all, the function of the circle board is to be an electoral college to elect the members of the district council. The general elections are held to elect members of the circle boards. The circle boards then hold a meeting and elect a certain number of members to the district council. At present the circle board has no other functions at all unless functions are delegated to it by the district council.

61912. It has nothing to do with rural development?—There are no other functions definitely laid down, but the district council has certain functions which it may delegate to the circle boards if it likes.

61913. Then you have first the district councils. After them you have the circle boards and then the village committees?—Yes, on paper.

61914. The village committee is the last?—Yes.

61915. Are most of the members of the village committees literate?—I cannot recall the figures, but you will find them in the Census Report. You will see exactly what is the proportion of literates to illiterates in Burma. There are few villages which have not some literate members.

61916. They are elected, I presume, by the villagers?—I am not quite sure, and I should like to see the book before I answer that.

61917. And no powers are given under this Act?—No, but they have powers under the Village Act, as assessors or as joint members of a village criminal court, for petty offences.

61918. Is that an arbitration court?—No.

61919. Are these village committees appointed for three or five years?—I think it is three, but I should like to refer to the Act.

61920. You tell us in your note * that the standard of living of the agricultural population in Lower Burma has risen remarkably during this century. What are the criteria by which you judge this standard of living? What definite indication have you of that?—The amount of a man's expenditure.

61921. The purchasing power has increased visibly?—Yes.

61922. Do you think their houses are better than they used to be?—There is a vast increase in the number of masonry buildings all over Burma. That is noticeable since I came to Burma. Then, people are using corrugated iron sheets in large numbers.

61923. What else?—The people always used to have silk garments; they want more of them now. Then take boots and shoes; the import figures for boots and shoes are remarkably large. Again there is an increase in the consumption of biscuits, sardines, cigarettes, soda water (you will find soda water factories in many villages). In many villages you will find that there are barbers' shops.

61924. Do you find less crime?—I do not think so. Crime has increased, I think.

61925. With the rise in the standard of living, you do not see any decrease in crime?—No. I do not see that; on the other hand, there is evidence of a great increase in crime.

61926. *Mr. Kamat:* I should like you, if you would, to give me some idea about the character of Burman labour as contrasted with the immigrant labour in Burma, speaking from your experience of this Province and your knowledge of the people. I think you will agree that Burman labour is supposed to be less industrious, less energetic, than immigrant labour?—Supposed by whom?

61927. I ask you whether you agree to it?—I do not agree to it myself.

61928. Are there some people who imagine that Burman labour is less industrious than immigrant labour?—You will hear it said by people in Rangoon who employ Burmese domestics that Burmese servants are less regular.

61929. Do you think that Burman labour is better than immigrant labour?—That is a somewhat sweeping statement; it is too general. If

* A Collection of Papers written by Government Officials for the Commission—Page 23

you ask the Burman cultivators (of course they are patriotic in their prejudices; still there is the test of money in it), they will tell you that they prefer to engage Burman labour in reaping and that it is worth more.

61930. Do you think that Burman labour is less efficient?—Ask the Burman cultivator; he will tell you "This place is badly reaped, and this was done by Indian labour."

61931. At any rate, you will agree that Burman labour is less efficient than, say, British labour?—No; I will not.

The Chairman: Under Burman conditions!

61932. *Mr. Kamat:* You really think that the Burman labourer is as energetic and as robust as the English labourer?—If you compare them in the work of clearing bamboo jungle, I have no doubt which will win.

61933. He is not so robust?—He is not so big a man; but if you mean, by robustness, hardiness and capability of living on scanty diet I should think the Burman would do better in such conditions than an English labourer.

61934. If he is not so robust, that helps my purpose for the time being. I am leading up to another question. If he is not so robust will you throw some light on what appears to me to be a most astonishing sociological phenomenon. It is this: You have, in Burma, certain social customs which very closely approximate to Western social customs; you have no caste here; the religion is homogeneous; marriage in Burma is a civil contract; the custom of divorce prevails to the same extent as in any country of the West or in America; and, lastly, there is no child marriage, I believe. So, the people of Burma follow social customs and institutions which are similar to those prevailing in the West. Now, I would like to ask you why the Burmese are not so robust and why they have to depend upon labour from Madras, a Province notorious for malnutrition and orthodoxy?—That question is one that might be answered in an encyclopædia or in a large literary work. But one handicap is public health; malaria and other diseases handicap the Burman cultivator.

61935. That may be one of the factors, and there may be a large number of others too. But I put it to you, will it stand as a general theory that tropical climate and malnutrition override the advantages of the excellent social institutions?—I am not quite clear what the question is.

61936. The position is this: With all the excellent advantages of social customs and institutions, which Burma has over other Provinces in India (I am putting it forward as a theory), I ask is it due to the tropical climate and to the rice diet which brings on malnutrition, that the people of Burma are not so robust as the people in Western countries. The tropical climate and malnutrition wipe out the good effects of the excellent social customs such as absence of child marriage and various other things which I have mentioned?—There is no doubt that inadequate diet has some effect, but I do not think that tropical climate is, necessarily, always unhealthy or incompatible with vigour. But as long as you have malaria and other diseases, people cannot be robust.

61937. Is there no disadvantage in a tropical climate?—No one knows how vigorous people can be in a tropical climate if you clear out malaria and clear out certain other diseases.

61938. You express a doubt about the bad effect of tropical climate. Take the agricultural labourer of the Punjab and of Burma. Although the Punjab labourer is at certain disadvantages arising from his social customs, he has the advantage of a cold climate. Do you not think that the Punjab labourer is better than the Burman labourer?—I do not know the Punjab, except for a week's visit.

61939. But it is well known that the Punjab labourer is an enterprising man?—Of course, he is a fine fellow.

61940. I put it forward as a theory that it is due to the advantage of a cold climate?—The question is too fundamental. I understand that human civilisation began in warm places and extended to cold places,

61941. *Professor Gangulee:* Have you noticed any change in the dietary? —There is a change of diet going on in Burma, and there is change in every branch of life. In certain places in Upper Burma, people used to eat millet and they have now taken to eating rice. In Lower Burma with the rise in the standard of living the diet of the people is becoming more and more varied. If you go into the bazaars of country places you will see an enormous variety of vegetables. There is a rise in the standard of diet generally.

61942. Are they taking to wheat?—It is coming in, more or less. Wheat is being used in smaller towns in Lower Burma; they are also taking to milk; it was never used before.

61943. *Mr. Kamat:* What is the total mileage of metalled roads in Burma? —I do not remember.

61944. In one of the leaflets issued in 1903, it is stated that you had 906 miles of metalled road; probably that figure has gone up during the last few years. I want to know the state of your budget and how much is being spent on the roads?—I am afraid I could not tell you.

61945. I have looked up the figures; I find your Provincial income is thirteen-and-a-half crores, and on original roads you spend only seven lakhs? —What roads are you speaking of?

61946. On original roads you are spending something like seven lakhs. Is it so?—I have not got the figures here, but this is a surprising figure; I think it should be forty-five to fifty lakhs. I am speaking from memory; I think it is forty-six lakhs.

61947. I should be obliged if you could furnish the Commission with the figures of your total revenue and what you spend on roads and repairs?— (*After looking up the figures.*) It is Rs. 49,20,000.

61948. That is on all sorts of roads?—They are Provincial roads.

61949. Not original roads?—What do you mean by that?

61950. I mean new roads for opening out the country?—When we talk of original construction, we take also mud roads which are metalled.

61951. The point is that, in one of the leaflets, you seem to lay the whole blame on road expansion on the Government of India, and I should like to have some explanation how the matter affects the Government of India?—That is Mr. Chalmers' note.*

61952. The statement made there is that the "absence of roads, railways and ordinary administrative amenities is due entirely to lack of vision on the part of the Government of India"?—These notes are personal statements by the officers concerned. Government have not examined them or authorised them. I think this note by Mr. Chalmers is in the collection of papers written by Government officials. They are not authoritative statements of the Government. That remark would be Mr. Chalmers' own opinion. I take it that he is voicing the general dissatisfaction of Burma with the Provincial settlement.

61953. So that the Government is not bound by it?—That is not an expression of Government's opinion.

61954. Could you give us an idea how much of actual cash balance the Burma Government have in their hands, say, from the rice control profits? —I am afraid I could not answer that question at all. I understand it was only a *pro forma* account, and I could not tell you out of hand. It would be an elaborate statement to say what was done with it.

61955. Anyway, does it amount to some crores of rupees?—It has a complicated history. It was a matter of crores, I think nine crores of rupees. Part of the money was first of all invested in railways and railway extensions. The railways have since been sold back to the Government of India. Part of the money was invested in the irrigation systems which were bought from the Government of India.

*Not printed.

61956. Was it ever under contemplation to devote a portion of that money for road expansion?—Yes, certainly. They have been debiting, to the *pro forma* account, a certain amount for the construction of new roads. The expert from the Public Works Department would tell you best about that. They can give you the figures.

61957. All I want to know is whether it was under contemplation to spend a portion of that for the purpose of road expansion?—Yes.

61958. With reference to the National Mortgage Bank, may I know why it is called 'National,' when it is more or less a Provincial matter?—Because the Burmans like to think of themselves as a nation.

61959. Or, probably, that term has been borrowed from Denmark?—I could not say where it is borrowed from. I think it is used in some English institutions of the kind. They have National Savings Certificates, or something of the kind, and that is probably what suggested it.

61960. In answer to Mr. Calvert, you explained that, just as in the case of ordinary savings banks, the people put in their money although they do not understand all the details, the same will be the case here. Do I take it by that answer that you want to place this proposed Land Mortgage Bank on the same footing as the ordinary bank, or do you want to give it more or less a co-operative character?—Certainly. Mr. Grantham's scheme was to have a co-operative element in it, and the co-operative element is chiefly required in his plan at the stage of examining the borrower, getting information from his neighbours, and the idea is that if you get mutual guarantee between the actual borrowers, you will get also information of the borrowers' financial standing and character. So, the primary mortgage society is to be a co-operative institution.

61961. With regard to the constitution of the board, what ultimately is the co-operative element which is admitted in the actual constitution?—In the board itself, there is nothing exactly co-operative, in the legal sense of the word. A village society is a co-operative business giving mutual security to secure long-term credit.

61962. Every member of the board is to be nominated by Government?—Originally, I think Mr. Grantham provides for ultimate election of the board by the district banks, when a certain number of district banks are established. To start with, it was to be a nominated board.

61963. As drafted, the Bill contemplates that this board, which has certain summary powers and which will control the whole of the organisation, is to be composed of nominated members?—Yes; to start with.

61964. And with a majority of officials?—Yes; mostly officials, I think.

61965. If a non-official is appointed at all, he will be nominated? Is that contemplated, or is it not provided for?—If at all, he will be nominated. The whole membership of the board is to be appointed by Government at the beginning.

61966. None of the district banks, or the other component parts of the organisation lower down, will have the right to elect a man on this board?—The intention was, as I said, that they should ultimately do that. This board is going to exist before the banks do, so that you could not elect the boards from the beginning. Members of the boards cannot be elected by non-existent banks.

61967. Then again, the associations or societies working as part of this organisation are to be divorced from the ordinary co-operative societies?—Yes. They will be a separate system.

61968. They are not only to be kept separate, but special associations are also to be created or brought into being by either the board or the district banks as part of this new organisation? Am I right?—Yes.

61969. Now then, the board is to be created by Government; the other component parts are to be created by the board. Is there anything of a co-operative character in the whole of this organisation?—When you said created, I assumed you meant the formal creation. Members of the primary society would not be compulsorily put in. They would have to form their association, voluntarily no doubt, with advice and encouragement from the district bank.

61970. With reference to the capital or funds at the disposal of this organisation, where is the principle of self-help and the contribution from the people's savings, which will be dealt with by this organisation?—Self-help or mutual help, I suppose, is included in the mutual guarantee that they give.

61971. All the funds are to be supplied at the initial stage by the Government?—The Government would supply a starting fund. One of the main functions, and, to my mind, the most important aim, of the bank is to raise debentures to popularise negotiable land mortgage bonds.

61972. There is a vein of complaint, in the evidence * supplied to this Commission by Mr. Chalmers with regard to the cess on the export of rice, that the pitch of land revenue incidence in Burma, compared with other Provinces, is high?—That is Mr. Chalmers' personal opinion. I am afraid I could not support it. I could not answer it myself.

61973. However, in a way, it is worth bringing to your notice here?—The rates, I believe, are higher but I cannot say as regards the incidence.

61974. We have been told on the other hand, that so far as the revenue assessments in Burma are concerned, the Burmans are lightly touched?—There is an important report on the revenue system of Burma by three Burma officers and Mr. Noyce, who travelled round India. They compared the fraction of nett profits or nett produce, whichever you may call it, and the Burma practice in land revenue settlements with the practice in other Provinces. I do not think I discovered any fundamental difference in our pitch of assessment, if you mean to ask about the pitch of assessment. It is a very difficult and complicated problem. I would suggest that if you would like to have that expounded, the other Financial Commissioner, Mr. Couper, who was a member of the Committee, would give you a well-informed opinion about the incidence of land revenue. He is the Financial Commissioner for Reserved Subjects. I can only give you opinions from general reading.

61975. You know the general state of the rice crops. We are told that the average yield per acre of paddy is worth fifty rupees and the cost of production is twenty-five rupees. Are these facts which you can accept?—That is a generalisation I should not like to make.

61976. No, that is a statement given to us by Mr. Hendry?—He is talking about Hmawbi and that part of the Province. He has probably given a reasonable estimate. Fifty baskets per acre is above the average yield for Burma generally.

61977. Supposing two rupees per acre, as we are told, were the assessment in Burma, two rupees out of a nett income of twenty-five is not a very high assessment?—But is two rupees taken to be the average assessment on land yielding fifty baskets? I should think it is probably above that; fifty-basket land, I should think, would probably be paying more than two rupees.

Sir James MacKenna: Five or six rupees.

61978. *Mr. Kamat:* Anyway, in the papers furnished to us, that statement is made, that land assessment here is higher per acre than that of Madras?—I cannot support that statement.

Mr. Reynolds: Fifty rupees was the outturn given, not baskets.

61979. *Mr. Kamat:* I said fifty rupees, not baskets?—Yes, that might be better.

61980. The point I was driving at was this: an attempt is being made by certain officers who have supplied figures to us to show that the Burman is taxed in land revenue more than the Madras man. I have looked up the figures; I want to know whether that is a correct statement?—I am afraid I cannot answer that; it is too complicated a question. I could not answer it in any satisfactory way without research.

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*Not printed.

61981. *U Ba Cho:* We have been talking about the check which the co-operative movement has experienced in its progress during the last three or four years and you have given us some of the reasons for this state of affairs. I am going to suggest some more and would like to know whether you agree with me. Since the starting of the co-operative movement in Burma we have had experienced and very senior officers at the head of the department?—They became senior; they did not start in the department senior.

61982. There was Mr. English?—He was of course nine or ten years in the department; he started as a Deputy Commissioner. He began in 1906 I think; I forget what his service was when he began.

61983. Comparatively speaking, the present holders of these posts are quite junior, when compared with the officers of those days?—I do not know that that is so; Government tries to pick out the best men with the most suitable experience. Probably they are a little junior to what they were.

61984. *Mr. Reynolds:* Both the last two officers have had seventeen years' service and upwards?—Then there is not much difference there.

61985. *U Ba Cho:* Some of them have had no experience in co-operation before becoming heads of the department?—Mr. Reynolds has cross-examined me on that and exposed my ignorance on one or two points. Mr. Steavenson had been in the department far longer than I realised; I forget exactly how long. It was in varying periods during four years: I think he was attached to the department several times.

61986. There are more recent officers?—I have told Mr. Reynolds my general impression; apart from exact dates. Your implication is correct that the recent Registrars have had less previous knowledge of the department than the earlier men. I think that is quite obvious, because Mr. English, Mr. Clayton and I had been in nearly from the beginning; these others had come in when the routine of the department was established, and if they had a few years' latter-day experience it was not the same thing.

61987. The officers in the Subordinate and Provincial Services of the Co-operative Department are supposed to stay in the department a long time; that is the policy of the Government; but superior officers are not bound by the same policy; they can come into the department and leave it at their will?—Yes, they are members of the Burma Commission and liable to be promoted to other posts.

61988. Do you think that is the main reason why there were so many changes in the personnel of the Superior Service in the Co-operative Department?—That is of course the reason of the changes, that they are not regular departmental officers.

61989. That is one of the causes of the check in the progress of the co-operative movement in Burma?—Yes, I think that has contributed.

61990. For some time there has been a crying need in Burma for a land mortgage bank?—The view I have always taken is that there is not a crying need for that so much as for more machinery for issuing loans. As I say, the *chetty* has done very good service and has been long in the business; he knows it very well and we shall have to be clever to beat the *chetty*. But what the country wants, I think, more urgently, is a means of investment for Burmese capital and such a means as will allow the capital to be easily shifted from one investment to another. A thing like negotiable bonds would be a most desirable machinery for that purpose. The ordinary mortgage investment is not negotiable; that is the difficulty.

61991. You admit that there is a desire on the part of most of the cultivators to have a land mortgage bank in the Province?—I think there is a demand for it now, but, if I may say so, the department worked up that demand. From 1917 Mr. Clayton and I began to talk about it, held meetings and worked up the idea to try to get people to realise what the thing was, pointing out the great advantages of a regular system of amortisation and so on; but of course, everybody who borrows wants cheaper loans.

61992. Then, up to date, this bank has not been opened?—No.

61993. In your answer to Question 15 (*b*) (*ii*), you say there is no popular demand for the expansion of the Veterinary Service?—Yes, I think that is so.

61994. If the cultivator knows that the Veterinary Department can do some good to his cattle, especially when they are sick, will he not seek its help?—Quite so, if you will educate the cultivator to see that, I quite agree. They would like their cattle to be protected and improved, but I do not think they much appreciate the value of Western methods in veterinary service any more than they sufficiently appreciate European medicine for human beings. There is a considerable reluctance to resort to European medicine, even for human beings, and I think the cultivators are not yet persuaded that the Veterinary Assistant has anything very much better to offer than their own traditional methods of treatment.

61995. But do you know that the officers of the Veterinary Department are looked upon as police officers by the cultivators because they only come when there is rinderpest in the village or in the locality?—I have heard a certain amount of talk of that kind, but as far as my experience goes it is not generally true. I have known a good many Veterinary Assistants and heard talk about them and so on; I do not think there is a general attitude of hatred towards them. I think the trouble is more that they are indifferent. As I say, they do not believe in Western methods very much. There may have been cases of Veterinary Assistants being overbearing or unreasonable in prosecutions and so on; that is the sort of mistake that you get in any Government business.

61996. You admit that the number of veterinary officers is very small when compared with the population of the extent of the Province?—I am not so sure about that. As a Government department, it is very strong in numbers. Of course, the trouble in this country is that there are no private practitioners, but in the absence of private practitioners, if Government has to supply every cattle doctor, no doubt the number is too small.

61997. Speaking of the land tenure system in Burma, you say the tenancy is a yearly one?—Generally, yes.

61998. Though it is in name a yearly one, in practice the same tenant remains for many years?—That is not sufficiently the case; there are many places where the tenants compete and the complaint is that they get turned out every year; there is a continual change. That depends, of course, on the landlord.

61999. But between Burman landlord and Burman tenant, especially when the landlord is a good man, the tenancy goes on from year to year?—In some cases, yes.

62000. With regard to the loans under the Agriculturists' Loans Act, I see from the Land Revenue Administration Report for the year ending June 1926 that the amount of loans given out for the year is only about twelve lakhs. Do you not think that amount is very inadequate, considering that about eighty per cent of the population of Burma depends upon cultivation?—What do you mean by "inadequate"? If you contemplate financing agriculture entirely by Government loans, of course it is entirely inadequate; but if it is merely required to assist the market for loans or to keep the price or loans from soaring too high, and so on, it may do much more good than the actual amount issued.

62001. The object of giving out loans under the Agriculturists' Loans Act is distinctly laid down; it is only given as a sort of relief to the cultivator when he is badly hit either by flood, pests or epidemics?—Yes; I think it is extended to bringing new land under cultivation.

62002. That comes under the Land Improvement Act, I believe?—Yes.

62003. My question is; do you not think a sum like this is a very small amount for the whole Province?—I do not think it necessarily is. As I say, the effect of these cheap Government loans may be to moderate the price of loans from private lenders. The demand for Government loans is limited by the inconvenience of getting them and the strictness in repayments, but the low interest, combined with these disadvantages, is

probably sufficient to make them an alternative to a private moneylender, so that if the private moneylenders' rates soar too high, a cultivator will resort to the Government loans, even though they are rather inconvenient; so that I think they will act as a moderating influence in the market.

62004. I want to ask your opinion about the clashing of interests between the fishermen and the agriculturists. From your experience can you say whether the interests of these two parties clash or not? In most cases the rights or claims of the fisheries man are upheld by the revenue officer?—If you ask me whether that is the case, I should say that it depends on the individual officer. Some people are pro-cultivator and some consider themselves guardians of Government's revenue and they will try to protect the fishery revenue. However, that problem is being dealt with by other means and the surest solution of all is the drainage works of the Public Works Department. There is a survey going on in the Pegu district, where some of the worst complaints have occurred, with a view to regulating the flood. That would side-track all these disputes, if you could get that done.

(The witness withdrew.)

U PO TIN, Assistant Registrar, Co-operative Societies, Pegu East Division, Rangoon.

Replies to the Questionnaire.

QUESTION 5.—FINANCE.—(*a*) For the better financing of agricultural operations, encouragement should be given to the spread of the co-operative movement all over the country; both short and long term credit, should be given through co-operative banks and co-operative societies, as is done in the Bombay Presidency; the financing institutions should endeavour to obtain deposits and loans at lower rate of interest so as to enable them to lend to co-operative societies at the rate usually charged by the joint stock banks.

(*b*) To induce cultivators to make fuller use of the Government system of *taccavi*, I would suggest that instead of lending to cultivators individually it should be lent through the co-operative banks. The rate of interest on this loan should, however, not exceed the rate at which Government borrows from the public.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—(*a*) (*i*) In my opinion, the main causes of borrowing are—

(1) improved standard of living and consequent higher cost of living without corresponding increase in production and income; and

(2) higher rate of interest on borrowing for cultivation expenses.

(*ii*) The sources of credit are the village moneylender, the *chetty* and the co-operative society.

(1) *Village moneylender.*—Usually charges a high rate of interest: from 36 to 60 per cent in cash and 100 per cent in kind, the system being elastic according to the condition of the debtor and the season. There is close proximity between the lender and the borrower and collection is made by the lender personally or by a paid agent. For such exactness in recovery made by the lender, the borrower has to suffer, but gets better treatment in really bad years.

(2) *Chetty.*—The rate of interest charged by the *chetty* is in most cases not so usurious as that charged by the village moneylender, being 18 to 36 per cent; but loans are generally made only to those who can furnish security of landed property or jewellery. The *chetty* insists on annual payment of interest in full and demands full repayment of loans after three years on the change of the agent of the firm. The rate of interest is small when compared with that charged by the village moneylender, but punctual payment is enforced without regard to the condition of the year and the debtor.

(3) *Co-operative societies.*—The rate of interest is 15 per cent which is less than that charged by the village moneylender and the *chetty*. Loans are made on the personal security of the members and punctual repayment is insisted on. In bad years, loans or parts of the loans are extended, according to the condition of the borrower.

Of these sources, the system of credit obtained from the co-operative society is the best, because (1) the rate of interest is small; (2) the debtors get better treatment; (3) the loans are given for productive purpose; (4) the use of loans is supervised by co-members; (5) the creation of reserve funds for the benefit of borrowers and posterity; (6) the profit is distributed by way of dividend, and (7) the borrowers derive educational and moral improvement.

(*iii*) The reasons preventing repayment are (1) drought and flood; (2) cattle disease; (3) calamity in family; (4) destruction of crops by insect pests; (5) excessive expenditure over income; (6) high rate of interest on borrowing.

(*b*) In my opinion, the measures necessary for lightening agriculture's burden of debt are (1) to encourage improvement in production and marketing of produce; (2) to encourage joint-purchase of daily necessaries of life; (3) to reduce rate of interest by forming co-operative societies; (4) to encourage thrift and savings; (5) to enforce rigidly the application of the Usurious Loans Act; and (6) to devise better facilities for the redemption of mortgages.

(*c*) No.

QUESTION 22.—CO-OPERATION.—(*a*) To encourage the growth of the co-operative movement, I think steps should be taken as follows:—

(*i*) *By Government.*—The co-operative societies should be helped financially through the co-operative banks. Government should provide adequate staff for teaching, audit and supervision of the societies.

(*ii*) *By non-official agencies.*—With the help of Government, these agencies should do the work of propaganda, teaching and supervision.

(*b*) (*i*) I have observed that small and new co-operative credit societies cannot be prosperous owing to small margin between the rates of borrowing and lending and high cost of management.

(*ii*) Purchase societies are not successful for (1) want of capital, (2) lack of trained manager and staff, (3) refusal of sale on credit, and (4) competition by other traders.

(*iii*) Societies formed for the sale of produce or stock are also not successful for (1) want of capital, (2) management by honorary workers, (3) lack of training in trade, and (4) competition by wealthy merchants.

Oral Evidence.

62005. *The Chairman:* U Po Tin, you are Assistant Registrar, Co-operative Societies, Pegu East Division?—Yes.

62006. How long have you been associated with the movement in Burma?—For some fourteen or fifteen years now.

62007. What positions have you held?—I started as a Junior Assistant Registrar in the department.

62008. The general trend of the evidence as to the co-operative movement before the Commission at the moment seems to indicate that there has been some decline in the movement. Do you agree that that, broadly speaking, is the position?—Yes.

62009. Are you disappointed that the movement has not gone ahead more?—No.

62010. You mean that you are not surprised?—No, I think that there is some reason for the decline.

62011. Would you tell the Commission what, in your view, are the reasons accounting for this decline?—The main reason is the relaxing of Government supervision. The department relaxed supervision in 1915.

62012. As a deliberate policy?—Yes.

62013. And that in your view was the beginning of the decline?—Yes.

62014. And is it your view and experience that relaxing official supervision led to the decay of efficiency in the primary societies?—Yes.

62015. Have you had experience of the movement in the Middle Burma dry tract?—Yes, I was in charge of the dry tract for some five or six years.

62016. Is that a tract where the co-operative movement might be expected to do very good service?—Yes; it is badly wanted there.

62017. But, in fact, its progress has been disappointing in the dry tract?—Yes.

62018. Has it been particularly bad in the dry tract?—Yes.

62019. Can you account for that?—That is due to drought and the poor outturn of crops continuously for some four or five years in certain parts.

62020. There was a series of bad years and that delayed repayment?—Yes.

62021. And brought financial difficulty?—Yes.

62022. The movement was not sufficiently sound to stand the strain?—It was due to bad business.

62023. If you had had adequate official supervision throughout this series of bad seasons which afflicted the dry tract, do you think that the societies would have survived?—I do not think so. The occupations of the members of the societies require improvement.

62024. That was a local experience and, if course, this sequence of five bad years does not account for the failure of the societies in the Lower Burma wet tract?—As far as my experience goes, most of the societies fail; there are very few in Lower Burma.

62025. Would you describe the movement in the Lower Burma tract as being satisfactory to-day?—Yes. I think so.

62026. Do you think the primary societies are sound?—Yes.

62027. Can you show any increase in the number of societies over the last three years?—As to this question, on account of some inefficient societies in the movement we do not encourage the registration of new societies.

62028. Do you agree with the policy of winding up societies that are in difficulty?—It is very difficult to say.

62029. Is the department carrying on any propaganda?—In fact, we are not doing any propaganda. Of course we employ honorary organisers in some parts; these are non-officials.

62030. So that you are doing no propaganda?—No.

62031. Is any unofficial body doing propaganda?—The unions are doing propaganda work. In Arakan, of course, official propaganda is still being carried on.

62032. How do they do propaganda work?—In Arakan our own officers attend to that work.

62033. Do the unions who do propaganda employ whole-time employees or do they employ voluntary helpers in carrying out this propaganda?—They employ voluntary workers, but they do propaganda work only in the neighbourhood, and not extensively.

62034. Let me put this to you: Do you think that enough propaganda is being carried out?—No.

62035. Do you find societies ready to help the Agricultural Department in the distribution of improved seed?—Yes.

62036. Is that a line of activity which makes a strong appeal to the primary societies?—In regard to seed distribution, I wish the department would do a bit more in the dry tract.

62037. In answer to Question 5, you say that you would like to be in a position to lend money at cheaper rates. At what rate do your Central Banks lend?—Ten per cent.

62038. At what rate do your primary societies lend?—Fifteen per cent.

62039. Where do you suggest the reduction should come in?—In the margin between the Central Bank and the primary societies.

62040. What rate are you thinking of, having regard to the security? Do you suggest that the rate should be comparable with that charged by the joint stock banks?—The joint stock rate is usually six or seven per cent.

62041. Why do not they lend money in this case? I take it that they can go down to the cultivator themselves and provide money at six per cent if they choose to build up an agency to do it?—The cultivator could not get it because he has no connection with the joint stock men.

62042. You do not think there is some connection between the security and the rate?—Yes, I do.

62043. How do you consider the reputation of co-operation stands with the cultivator in Burma?—Not bad.

62044. It is not very good?—No, it is not very good; on account of some bad societies in the dry zone tract the reputation is not very good.

62045. It is not very popular?—No.

62046. Would you tell me something about the best primary credit society that you can think of?—There are many good societies, some of which have, on an average, about twenty-two members. I know of a dozen good societies with a very strong reserve fund.

62047. Where was that reserve held?—It was used in the society as approved by the Maclagan Committee and they have been paying a dividend of about twenty or twenty-five per cent. In some societies there are about thirty or forty members.

62048. Have you got any society with over fifty members?—Yes, there are societies with over that figure; in fact with over a hundred, and in some cases even with over two and three hundred members in the rural areas. In such cases we have had to sub-divide the societies.

62049. Have you, yourself, had any experience of the working of sale societies?—Yes, I was in charge of some groundnut societies for some years.

62050. Could you tell us how matters were arranged between the members and the society? Did the society buy the groundnut outright from the members?—No, the members produced all the groundnut which was collected and sent it to the headquarters in the name of the primary societies. The primary societies were treated as members of the central society. The central society, in my time, did some forward sales with a company in Rangoon.

62051. How was the individual member cultivator paid?—He was paid eighty per cent.

62052. And he got the balance after the sale?—Yes.

62053. Were the lots brought in by various cultivators put together for purposes of sale?—Yes.

62054. So that the price obtained by the cultivator was the average price for that class of groundnut?—Yes.

62055. Was that satisfactory?—It was satisfactory, but we could only do it for a year; after that the War came and no big millers were forthcoming to buy this crop; and, of course, I myself was transferred here.

62056. Are there any other sale societies dealing with groundnut now?—This is the only society which deals with groundnut. There are some paddy sale societies in Upper Burma.

62057. Are there any cotton sales societies?—No.

62058. *The Raja of Parlakimedi:* You say that in Upper Burma you have the largest number of societies?—Yes.

62059. May I know in what way those societies have been actually helping the agriculturist?—In getting funds for agriculture, in buying cattle and in paying small loans, or what we call old debts.

62060. How many agricultural societies have you in Upper Burma?—Two-thirds of the total in Burma. We have now got 4,000 credit societies.

62061. Are those societies helping the ryot to secure improved strains of seeds, as well as the manures suggested?—Yes. The Agricultural Department started the distribution of these seeds with our members; our members used the sort of seed recommended by the department.

62062. Do you maintain any record to show what actual work you are doing?—We have not any record.

62063. Do you not maintain any record to show how much of manure or seed you have been able to distribute among the ryots?—No.

62064. How many times are you supposed to visit a society?—I am supposed to visit (or rather my assistant) a union consisting of five or six societies once a year.

62065. What work of supervision do you actually do?—We see whether the society is being run according to the by-laws; we have to point out errors and see that they are run according to the law.

62066. In what particular subject have you been interesting yourself personally and in what particular field have you been instructing the societies to take greater interest?—In all fields; we are bound to do that. We have to see that the accounts are correct; sometimes, in the issue of loans, we have to see whether the by-laws have been followed.

62067. Do you try to meet the members of the society personally?—Yes; especially in the case of bad societies we have to visit the village.

62068. I mean, do you try to popularise the principles of co-operation?—When I visit the unions the people in the neighbourhood come in, and I preach to them the principles of co-operation and point out to them the benefits to be derived from that movement.

62069. Do you think it has a good effect?—It has.

62070. You mention, in answer to Question 5, that *taccavi* loans might be distributed through your department?—*Through co-operative* banks.

62071. Do you think you will be able to look after that work also in addition to your present duties?—I suggest it only for our own members (the members of the co-operative societies); what I suggest is not applicable to non-members. *Taccavi* loans for members should go through the bank instead of to the individual member direct, because it is objectionable from the point of view of the bank itself.

62072. To what purposes would you apply the *taccavi* loans?—For purchase of seeds, or for other agricultural expenditure when people are afflicted by floods or cattle diseases. Generally our members go to our banks only.

62073. It is for land improvement chiefly that *taccavi* loans are given?—It is also meant for purchase of cattle and seed.

I am not quite sure whether *taccavi* can be applied for purchase of seed.

U Ba Cho: They do not know the real meaning of *taccavi*.

62074. *The Raja of Parlakimedi:* Are you interested in general marketing?—Yes; I have said something about groundnut.

62075. What about paddy?—For paddy we have not yet started in Lower Burma.

62076. You are running a great risk by not safeguarding the reputation of your paddy. Before your paddy reaches the market it is mixed (of course the cultivator is not responsible for it; the people who take it to the mills do it). If the co-operative societies take up this work, they will do a good service?—We can do it if the big mills encourage us, and allow us an advance in the way I have suggested in the case of groundnut. We have to advance eighty per cent; they cannot wait till the settlement.

62077. *Sir James MacKenna:* What were you doing before you joined the Co-operative Department?—I was a clerk in the Registrar's office, for some time clerk in the office in charge of the special enquiry in deltas, and also in the Settlement Office.

62078. What was your educational qualification?—Only middle school.

U Po Tin]

62079. Would you attribute the lack of progress in the co-operative movement to the relaxation of official control?—Yes.

62080. Is it not due to the lack of interest taken by the people?—What I say is, we relaxed the supervision rather too early; we relaxed it in 1916, when the movement was only ten years old.

62081. Do you anticipate a time when the movement will be independent of official control?—The time may come; we cannot relax official supervision all at once; the supervision must be there all the time, until the societies are able to run their own show, but you can withdraw it gradually.

62082. You cannot give a period of time within which it could be done?—No.

62083. I suppose you know that you have the largest Co-operative Department in India?—I have never gone through a comparative statement like that.

62084. *Professor Gangulee:* What was the reason for relaxing this supervision that you are talking about?—It was recommended by a committee that Government supervision should be relaxed.

62085. Your view is that the relaxation was premature?—Yes.

62086. What do you recommend at present?—We should revert to the old policy. The majority of our staff do super-audit work; that should be abolished and all our staff should give advice.

62087. That means an increase of staff?—No, because we are dispensing with the work of super-audit; the staff that do super-audit work will do the supervision work.

62088. In answer to Question 22 (*b*), you say that there is little margin between the rates of borrowing and lending; what is the difference between your borrowing and your lending rates?—Five per cent.

62089. Do you think that that margin is too small?—I think so.

62090. What is your ideal margin?—I give the causes of failures of small societies as the small margin and the high cost of management.

62091. Do you have a committee of management?—Only a single committee.

62092. What is the cost of management of a single society?—A small society is affiliated to a union and the union is affiliated to the district association. These small societies have to contribute to the union fees, meet the expenses of travelling, contribute to the pay of the supervisor, give the district association rate, and even to the Provincial Council assessment rate.

62093. Could you give us an idea of the actual cost of management of a small society (the total sum)?—The cost varies from over fifty to a hundred rupees.

62094. You consider that to be too high?—Yes.

62095. Have you any suggestions for reducing that cost?—We can reduce under the heads "contribution for union supervisor" and "pay of audit fees." Several societies have to pay audit fees.

62096. You described one good primary society that you knew. Do you find that there is a sufficient number of members in that society taking an interest in the management?—Yes.

62097. You said there were thirty or forty members; how many of them were taking an interest in the management?—Almost all take interest in the affairs of the society.

62098. You have a committee of management; how many members have you in that?—About eight; the by-law prescribes not less than six.

62099. Do all the members of the society apart from these eight, take a live interest in its management?—Not all, but the majority of them.

62100. In that good society that you know of, do you think the co-operative movement has promoted thrift amongst the members?—Yes, in the form of increase in share capital and accumulation of reserve fund.

62101. Outside credit work, are there any other activities in which the good society that you mention is engaged?—*It is purely credit.*

62102. Out of credit societies, they do not develop other forms of co-operation?—No.

62103. Reverting back to the question of interest, has the good society had any effect on the local rate of interest in the area in which it is working?—It reduced the rates of interest.

62104. To what extent?—Before the starting of the society, the rates were sixty per cent per annum. It was then reduced to thirty-six per cent, after the society came into existence. Of course much depends on the security of the borrower. In some cases, it is still forty-eight per cent. In some cases, there is the practice of selling the crop green.

62105. Have you published any literature, in Burmese, on co-operation?—We have. The department has issued leaflets on many subjects.

62106. Is that with regard to the activities of the department?—Yes.

62107. Have you published any pamphlets in the vernacular?—Yes.

62108. Are they extensively read?—They are distributed to all interested persons who enquire for them and the general instruction is that when they are asked for they should be given.

62109. I understand that, in seed distribution work, the co-operative movement is of great assistance?—Yes.

62110. Apart from that, what assistance do you give to the Agricultural Department?—Apart from that we try their seed, and also try suggested new crops, implements, and things of that sort.

62111. What assistance do your primary societies receive from the Agricultural Department?—The officers of the Agricultural Department visit societies, suggest new implements, new seeds and crops that would be suitable to the soil of the tract.

62112. In the good society that you have described to us, do you find that the borrowers have attained the educational and moral improvement which you had hoped to see?—I should say, yes, because they know the banking methods of the society; they know that they have to pay punctually, and they know the methods of meeting, supervision, and such other thinks.

62113. Do you hope to see any non-official agencies coming forward, which can help the co-operative movement? Is there any non-official agency now?—We have got a non-official agency called the Burma Co-operative Association; no official is a member of that Association.

62114. Are you satisfied with its work?—Its activities are at present limited. They could not do any propaganda work.

62115. What were the handicaps in the way of their doing propaganda work?—They do very limited work, because the non-officials cannot give us their time and labour; they have their own work.

62116. They have not got sufficient enthusiasm?—There may be enthusiasm; still, they have got their own business to attend to. They cannot give sufficient time to our movement.

62117. You do not expect to have a good non-official agency to assist you?—We cannot expect it in a short time. In the long run, it may come.

62118. You think the indications are that such non-official agencies may be forthcoming?—Yes.

62119. *Sir Thomas Middleton:* You suggest that *taccavi* loans should be passed through the co-operative societies?—Yes.

62120. What would happen to those who are not members of co-operative societies?—I suggest that only for members of societies.

62121. You set out, in answer to Question 6, the three sources from which the Burmese cultivator may borrow money, and you set out all the advantages that are offered by the co-operative society. If the society offers all these advantages, why is the co-operative movement failing?—The majority of failures is in the dry tract; the business of the cultivator is not successful on account of bad seasons there.

62122. That does not account for the failure. The fact that he met with bad seasons would increase his need for borrowing?—Yes. They could

not repay the old loans, and new loans could not be given to them unless they paid the old loans.

62123. You point out that you have been lending at fifteen per cent, the *chetty* at thirty per cent, and other moneylenders at sixty per cent. May it not be the case that you have been trying to lend at too low a rate?—That is not reason for failure to repay.

62124. Is it the reason for the failure of the society?—Probably, its inability to repay its creditors in time may be among the causes of failure.

62125. The people who leave your societies resort to the *chetty*, or to the village moneylender?—No, I do not mean that. The failure of the society is due to the fact that the society cannot repay the financing bank, and ultimately it comes to dissolution.

62126. Because the society was lending at rates of interest which were too low, and had not accumulated a sufficient reserve fund?—I do not think so; the reason is because the cultivator fails in his operations.

62127. Is liability limited or unlimited?—It is unlimited.

62128. Does this not suggest the reason why cultivators are not very keen to join co-operative society in bad times? If his neighbours are likely to fail, he knows that he may become liable?—In bad times, of course new members will not join, because of the fear of additional liability.

62129. There is another reason that occurs to me that may prevent members joining your societies. Is it the case that the moneylender and the *chetty* have got a strong hold over most Burmese cultivators?—No, I do not think so.

62130. They do not say to the cultivators "If you deal with the co-operative society, you will get no more from us"?—In the early days, at the start of the movement, there were such cases, but at present there are no such cases, and they do not very much fear the moneylender.

62131. I still fail to see why it is that the withdrawal of Government inspection should have caused these societies to fail, when the real cause of failure seems to have been bad times?—I have mentioned the causes of failure.

62132. You attributed it to lack of inspection?—That is one of the causes. The main causes I have given in reply to Question 6 (*a*) (*iii*).

62133. *Mr. Calvert.*—Apparently, your opinion is that Burma has made the mistake of having too little official supervision in the movement?—I say that we withdrew it prematurely, because we did so when the movement was about ten years old.

62134. You, as Assistant Registrar, have a certain staff under you?—Yes.

62135. What are your responsibilities for teaching that staff?—For teaching we arrange annual courses, and there is an annual examination by the department.

62136. Is that carried out by you?—All the members of the staff meet at a centre and take refresher courses for a week.

62137. That refresher course is for the whole Province?—Yes.

62138. You, as Assistant Registrar, are not personally responsible for the education of your own staff?—Not for the staff, but I am responsible for the education of the societies' staff, that is, the union secretaries, societies' secretaries, and supervisors. For that purpose, we are holding courses twice a year.

62139. Could your staff pass a fairly stiff test in my book on the principles of co-operation?—Yes.

62140. They could answer questions pretty fully from that?—Yes. In fact, they could answer questions on the principles of co-operation and accountancy.

62141. Your repayments, as shown in the last annual report, are round about twenty-four per cent. Are these repayments all in cash or are they on paper?—They are in cash.

62142. That is the exact amount of cash which is handled by the committee of the society?—Yes.

62143. Is there, normally, any period between the repayment of the instalment of a loan and the giving of a fresh loan?—Yes, there is some period. There is the payment by members and the collection of the loan by the committee of the primary society; the money is sent to the bank, and after the lapse of about two weeks, or in some cases a week, they get a new loan from the bank and re-distribute it.

62144. Do you get cases where a man borrows a fresh loan from his society in order to repay the old one?—There are some cases; of course, we detect them.

62145. You have, in Burma, the system of guaranteeing unions?—Yes.

62146. These unions recommend loans to societies?—Yes.

62147. They also guarantee the Central Bank the repayment?—Yes.

62148. In the societies which are now in distress, to what extent is that guarantee proving effective?—In the past we have found that liquidated societies have paid bank loans fully. Other societies had to pay for one society. There may be some cases at present pending in which all the societies in the union were dissolved. There may be bad cases in which the majority of the societies were dissolved.

62149. But actually, under that guarantee, has one society ever been called upon to make good the deficits of another society?—Yes, in a few cases.

62150. I see you have got about three hundred societies under liquidation?—Yes.

62151. The outstanding liabilities are about ten lakhs of rupees?—Yes.

62152. Of which only twelve per cent were recovered within one year?—Yes.

62153. That rather suggests about eight years to liquidate a society?—Yes.

62154. Why is not the guaranteeing union paying up?—The present policy is to demand the amount from the guaranteeing society at the last moment when we find the primary society is hopeless and cannot get anything out of the members. The cause of the delay in the collection is that, in former days, we left the liquidation to unofficial liquidators. As you know, liquidation is very troublesome in some cases, so we have changed that policy during the last year and we employ officials as liquidators, junior Assistant Registrars; that scheme will improve things.

62155. In your liquidation proceedings are there instances in which the members' land is sold?—Yes.

62156. Have you had instances in which the unlimited liability of the members is called upon to make good a deficiency?—Yes, in one case.

62157. In your liquidation proceedings have there been disclosed any defects in the Act?—No, I could not find any.

62158. In your liquidation do you find the system of personal sureties proving of value?—Yes, I should say so.

62159. I do not quite understand why your liquidation should take eight years, if you can sell their land, if you have sureties, if you have unlimited liability, and if you have a guaranteeing union?—That is what I have just suggested: in former days we employed non-officials as liquidators and they were not very active in their work. Being non-official, they are not responsible to the department. So seeing that, we tried last year to employ our own men to speed up.

62160. Liquidation is unpleasant work?—Yes.

62161. And non-officials do not like it?—They do not like it.

62162. You have, in Burma, this share system?—Yes.

62163. And you show in your annual report something round about thirty-seven lakhs of rupees as shares?—Yes.

62164. Has that all been paid up in cash?—Paid up in cash.

62165. Not on paper?—No.

62166. It has not been merely shown as a loan from the man?—In some cases it may be shown as a loan which is made due at harvest.

62167. You show your reserve fund also as thirty-seven lakhs?—Yes.

62168. Were the profits out of which the reserve fund is formed all realised in cash, or was anything added to the principal?—It is realised in cash, and of course it is not deposited elsewhere but lent out again, so that it goes into the loan business.

62169. But does a man actually pay up his interest in cash, or is it added to the loan and shown as an increased loan?—No, in the majority of cases it is paid in cash.

62170. So that you have round about thirty-seven-and-a-half lakhs of reserve and thirty-seven-and-a-half lakhs of share capital, and about three-and-a-half lakhs of current profits, making something over seventy-eight lakhs of rupees owned capital?—Yes.

62171. The total loans outstanding at the end of the year were 173 lakhs?—Yes.

62172. That is to say that fifty per cent of your loans outstanding were covered by the capital owned?—Yes.

62173. Does that mean you have not really recovered your reserve and your shares, or, having recovered it once, you cannot recover it a second time when you have lent it out?—When recovery is made it is paid in cash in fact; some is paid to the bank and the rest is re-lent. When it comes from the bank it is of course lent out again.

62174. You have got practically fifty per cent of your loans outstanding covered by money owned by the bank?—Yes.

62175. And in liquidation your first care is to pay off your outside debts?—Yes.

62176. Which are less than half of the total?—Yes.

62177. Does that mean you cannot recover even half your debts outstanding?—I do not say we cannot recover them; we try our best. In some bad cases, there may be a certain percentage which we cannot recover.

62178. That is to say, you blame the liquidator rather than the member; the whole blame really rests with the liquidator and not with the member?—Yes, in the case of liquidation it rests with the liquidator.

62179. With this very large percentage of owned capital, your movement is really solvent; if, out of your total outstandings, more than half are covered by the society's owned capital, then the movement really is solvent; there is no fear of the Central Bank losing its money?—No fear.

62180. Have you got many societies which now have got sufficient capital of their own to meet all their needs?—No, not yet.

62181. Not in which the share capital and reserves cover all the requirements?—Their own capital is reserved for annual expenses; it is quite sufficient. But successful societies want to redeem their land, they want to buy land, and productive loans are required, so that they have still to go to the bank for a new loan. If the bank refuses, they can go on with their own capital, in some cases, for annual needs.

62182. You had your primary audit conducted through your co-operative council?—Yes.

62183. That has broken down I gather?—Yes, I should say it has broken down because they could not collect sufficient funds.

62184. Was the breakdown due to lack of funds to pay the auditors?—Yes.

62185. It was not due to the auditors failing in their duty?—No, it was due to lack of funds.

62186. The audit was found, on test, to be good?—Yes.

62187. In the education of the members, do you teach them to comply with the Act and rules because they are orders of Government, or to carry

out the Act and rules because they are for their own personal good?—For their own personal good.

62188. *Dr. Hyder:* Have you many colleges in Burma?—Very few, only three.

62189. Are such subjects as book-keeping and accountancy taught at the colleges to young Burmans?—Book-keeping and accountancy are taught as optional subjects.

62190. Have the men who come into the Co-operative Department as servants of the State received any training in accountancy and book-keeping as part of their general education while at college?—Yes, they ought to.

62191. Do they?—That depends on the rules governing recruitment to the department. The recruitment of officers is practically on the same basis as that of the Subordinate Civil Service, so that these subjects are not strictly enforced as qualifications for competition in this examination.

62192. In your answer to Question 6 (*a*) (*iii*), you say that excessive expenditure over income is one of the reasons which prevents repayment?—Yes.

62193. What about your members of co-operative societies? Do they also live beyond their incomes or have you noticed any change?—My experience is that their expenditure is not covered by their incomes.

62194. So that there is not much difference between a member and a non-member?—Not at present.

62195. Have you read any of the novels of Dickens?—Yes.

62196. You know what Mr. Micawber says about living beyond one's income?—Yes.

62197. That if a man has an income of £20 and spends £19 19*s.* 6*d.* the result is happiness, but if he spends £20 0*s.* 6*d.* the result is unhappiness?—There are certain circumstances which a man cannot go beyond.

62198. You say that measures should be taken to enforce rigidly the application of the Usurious Loans Act. The members of the Subordinate Service in Burma are Burmans, are they not?—Yes.

62199. They know the law they have to administer?—Yes.

62200. Do you mean to say that they do not administer the law?—That is left to the discretion of the judges. So I suggest it should be enforced more rigidly. There ought to be some means by which the Usurious Loans Act should be clearly brought before the judge.

62201. Please turn to your answer to Question 22 (*a*) where you speak of non-official agencies. Have you ever tried, or have the members of your department ever tried, to enlist the sympathy of the yellow robe, I mean the *Pongyis*?—It is rather difficult with regard to the priests of Burma. In a few cases (I think two or three monks) they have helped the co-operative movement. The majority, according to their law of priesthood, can have nothing to do with worldly affairs.

62202. But they have started societies of their own, have they not?—They have, in some cases. We cannot say, generally. In a few cases they started their own private societies of course with the help and advice of the monks.

62203. How are your cattle insurance societies working?—I think they are decreasing in popularity. They are not working well. I am not in charge of those districts, but from the news and reports I have had, I think they are not working well.

62204. *Mr. Reynolds:* You gave the chief reasons for the check in the development of co-operation in Upper Burma. You referred to the failure to repay loans as the chief reason, apart from the premature relaxation of control and the series of bad seasons. You say you were in charge of the Upper Burma districts for some years?—For ten years.

62205. How long ago was that?—That was up to 1918 or 1919.

62206. That would include most of the dry areas?—Yes.

62207. Would that include Sagaing?—I have never been in charge of Sagaing.

62208. At that time was the movement flourishing fairly well?—Yes.

62209. It was towards the end of that time that the control was relaxed?—Yes.

62210. Were the seasons good when you were in Upper Burma?—They were sometimes good and sometimes bad.

62211. You think the seasons have been worse since you left?—Yes, in Sagaing and part of Shwebo and Myingyan.

62212. There was a series of bad seasons since you left?—Yes.

62213. You have not had any first hand evidence yourself about these bad seasons?—I only heard about them from other people.

(The witness withdrew.)

Mr. S. F. HOPWOOD, M.C., Officiating Chief Conservator of Forests, Burma.

Replies to the Questionnaire.

QUESTION 19.—FORESTS.—(*a*) I am of opinion that forest lands as such are at present being put to their fullest use for agricultural purposes. Grazing facilities have been granted to the extent compatible with the proper preservation of forest areas. In the year 1926-27, 2,756 square miles of reserved forest were open to grazing of all animals except sheep and goats for the whole year and 4,321 square miles were open for part of the year. In addition 62 square miles were open for the whole year and 162 square miles for part of the year to all animals. 21,346 square miles were closed to all animals for the whole year. 181,081 buffaloes, 272,029 cows and bullocks and 13,033 elephants were grazed free in reserved forests during the year. There are no restrictions on the grazing of cattle throughout the whole area of unclassed forests—94,552 square miles. In the past, grazing and cattle trespass in reserved forests have been treated as matters of comparatively little importance. It is probable that in the future suitable methods of control will have to be introduced. Unregulated grazing introduces disease into the forest which affects both the wild life living in the forest and the domestic stock employed on timber extraction and transport.

(*b*) The question of increasing the supply of firewood in rural areas is, except in the dry zone, not one of very great importance and is mainly a question of transport. The forests of Burma contain an almost unlimited quantity of firewood which is supplied in very large quantities to the railway and steamship companies, such as the Irrawaddy Flotilla Company. Its price is practically the cost of cutting and transport *plus* a small Government royalty. The question of the supply of firewood to villages in the dry zone is a difficult one. The villagers are naturally not in a position to pay the cost of transport from the forest. More than fifty reserved forests have been formed in the last twenty-five years in the dry zone districts, namely, Lower Chindwin, Pakokku, Myingyan, Meiktila, Minbu, Magwe and Thayetmyo. As all land in these districts capable of growing crops is cultivated, reserves could only be made by taking up the dry stony hills which are to be found scattered over these districts. Numerous plantations have been made in these reserves. These plantations

were mainly considered as experiments and have met with little success. These reserves were formed usually in the teeth of considerable opposition from the local villagers who objected to the restrictions caused by the reserves on their grazing and free collection of firewood. These reserves have proved very expensive, though some of them have yielded a certain amount of revenue from fines inflicted on the villagers for forest offences, chiefly illicit grazing and extraction of firewood. Some of these reserves have already been disforested and the retention of the remainder largely depends on the success or otherwise of certain experimental plantations which have been made in the Meiktila district.

The question of the supply of fodder in rural areas has never been considered a part of the duty of the Forest Department in Burma, but as stated in my reply to Question 19 (*a*), all the unclassed forests are open to unrestricted grazing. The question of increasing the supply of fodder is a matter for the Agricultural Department.

(*c*) With the exception of certain small and comparatively unimportant areas in the Kachin Hills, the question of soil erosion does not arise in Burma. In the area in the Kachin Hills referred to landslides have occurred through soil erosion due to the practice of shifting cultivation. The Forest Department have taken some of these areas in hand and planted them up with trees with a fair measure of success. I can suggest no remedy for damage from floods other than river training. This is a question for the Public Works Department.

(*d*) There is no doubt that when an area is covered by forest the supply of water in the soil is regulated and increased and this increase of moisture is of great value in areas at the headwaters of irrigation canals. In Burma, very extensive areas at the headwaters of irrigation canals have been formed into reserved forests. Examples of this are to be found in the Minbu and Shwebo Forest Divisions and at the headwaters of the streams which irrigate the Kyaukse and Mandalay districts. It is very doubtful whether forests increase the rainfall, but it is probable that they do so to a certain extent. I do not think that the destruction by erosion of agricultural land is a question of any importance in Burma. I cannot recall any instances of it.

(*e*) I do not consider that there is any opening for schemes of afforestation in the neighbourhood of villages. Very many villages in Burma are close to the boundaries of reserved forests and some are actually situated inside the reserved forests. There have been numerous reserves, formed in the plains of Burma near villages. Such reserves have always been very unpopular with the villagers and several of them have been disforested and the question of disforesting the remainder is one which is always arising. Any schemes of afforestation in the neighbourhood of villages imply that waste land which is capable of being planted with timber and which is not required for permanent cultivation must be reserved as it is a waste of time for the Forest Department to go to the expense of regenerating public forest land only to find that it has no legal powers to prevent the unauthorised destruction of what it has planted. Accordingly in Resolution No. 1R.-47, dated the 15th November 1919, it was laid down that reservation must be undertaken with the consent of the neighbouring villagers for whose benefit it is being made; in fact the Forest Department must follow and not go in advance of public opinion and no steps can be taken in any locality until local people and local officials are generally in favour of the same. It is most improbable that local opinion in any village or group of villages will ever be in favour of areas near villages being reserved. We have in Burma 28,647 sq. miles of reserved forest and it is probable that an additional 10,000 sq. miles will be reserved. This area is capable of yielding all the requirements of the Province in timber and firewood and the supply of this produce to villages is a question of transport.

(*f*) The reserved forests are not suffering deterioration from excessive grazing, but the incidence of grazing and cattle trespass in our reserved forests is assuming yearly greater importance and suitable methods of control will have to be introduced into many of our reserved forests.

Mr. S. F. Hopwood]

Oral Evidence.

62214. *The Chairman:* Mr. Hopwood, you are Officiating Chief Conservator of Forests in Burma?—Yes.

62215. In the memorandum * I have here entitled "A Collection of Papers written by Government Officials" for the Royal Commission of Agriculture, on page 155, we have a picture presented to us of the state of affairs in the various areas of Burma and a clear statement of the area under various classes?—Yes.

62216. What is the rule as to grazing or grass cutting in the 31,000 square miles of reserved forests?—A certain proportion of them is open to grazing of all animals; 2,756 square miles are open to grazing of all animals except sheep and goats, and 4,321 square miles are open for part of the year. Thirty-three thousand cattle grazed at full rates in reserved forests in 1926-27 and a revenue of Rs. 11,000 was realised. This grazing was spread fairly evenly over the reserves of the Province excluding the Chindwin Circle.

62217. What about the grass-cutting areas?—I do not think the Burman cuts grass at all.

62218. What are the charges levied for grazing?—In the greater part of Burma we charge practically nothing.

62219. You mean it is a very small sum, or actually free?—In many cases, in the great bulk of cases, in fact, it is actually free, but round Maymyo specially and elsewhere we have special grazing forests; the animals which graze in the Maymyo reserve are licensed. In the more distant areas from Maymyo they pay from two to four annas a head per month and close to Maymyo they pay as much as in Maymyo, that is, eight annas.

62220. That is with a view to encourage people to go far?—Yes. That is an exceptional case.

62221. I gather that you are not concerned with the damage which results from grazing, but rather with the damage which is being inflicted on the accessible areas and the unclassed forests by the rural population?—The unclassed forests are far greater in extent than the reserved forests and the local population are allowed to take anything they want free within ten miles, for domestic use.

62222. In the more outlying areas of these unclassed forests, serious damage is being inflicted by unchecked shifting cultivation?—Yes.

62223. Is there any shifting cultivation in reserved forests?—Yes, there is, but it is regulated.

62224. Does it do any harm?—It does great harm.

62225. In what way?—These tribes who practise this shifting cultivation cut down all the trees, except teak and in consequence they do great harm to the forests.

62226. I was also thinking of the damage by erosion following the cutting out of the timber?—In certain districts, in the Kachin Hills, to a certain extent it is due to shifting cultivation and not to cutting timber.

62227. I thought that cutting timber down was an essential part of shifting cultivation?—I thought you meant cutting timber for trade purposes.

62228. With reference to these two sources of damage, is it your view that some definite policy should be framed to meet the situation?—No, I do not think so. The areas of unclassed forest which suffer most from this practice have all been examined and Government has decided that they cannot be reserved because of the rights of user which will be involved. If they could be all reserved, reservation would be the best policy to adopt.

62229. No control is possible without reservation?—No control is possible without reservation, speaking very broadly. We do, as a matter of fact,

* Not re-printed.

control them in certain ways. We prohibit firewood being cut in some areas for the use of Flotilla steamers or for the railway but we cannot control the local population's own use of these things.

62230. You have the situation summed up in two sentences here. This memorandum says: "The accessible areas of these unclassed forests have been largely depleted of useful growth and are steadily deteriorating under uncontrolled grazing and wasteful use." Then the memorandum goes on to point out the immense importance of these to the rural population. On page 155 you find this sentence: "The general advance in prosperity is gradually relegating the bulk of the forests to the hills, and the plains will soon be devoid of useful forest outside the limited areas of reserved forest that have been taken up." Is that, in your view, a situation which does not merit particular steps being taken to meet the danger?—If we could frame a policy to meet the danger it would be an excellent thing, but our efforts in the past have met with a very great lack of success.

62231. I understand the matter is not merely a question of depriving the cultivator of something which he requires in order that timber may be got out of the forests. It is a question of trying to better the steadily deteriorating situation which, in a measurable time, will mean that the rural population will not have available wood, canes, bamboos and so on, upon which they depend entirely for their immediate requirements?—That is quite true; they will not have it in unclassed forests but they will have ample supplies from reserved forests.

62232. That brings us to the question of the disposition of the reserved areas in relation to the rural population. If a group of cultivators *live* more than a certain distance from the reserved forest, the produce of *that* forest is not of much use to them?—It is entirely a question of transport.

62233. Is it your view that a considerable part of the rural population of Burma stands in danger, to-day, of finding itself, in the measurable future, lacking in these essential forest products?—*Yes, that is so.*

62234. Is that, from the agricultural point of view, a very serious situation in your opinion?—*No, not very serious.*

62235. Why not?—Because they manage to get on without them. We could not supply them. They live for the most part in the dry zones and we have attempted to make plantations on the stony hills in the Pakkokku and Myingyan districts, where no fewer than fifty-six reserves have been made, and they are all run at a heavy financial loss. Why should we spend money to benefit a few straggling villages that happen to be in the neighbourhood of those reserves? We make those reserves in the teeth of very great opposition from these neighbouring villages.

62236. I do not quite understand your rhetorical question as to spending money for the benefit of straggling villages?—Instead of attempting to make these plantations on these barren areas near villages in the dry zone, we should rather make plantations of teak or other valuable species in places suitable for such plantations. We are very limited in the matter of money and establishment for making plantations, so that we can only plant some 5,000 acres a year. We cannot afford to waste our money and establishment in making plantations on these dry barren areas for the benefit of a few villagers who are extremely poor and cannot even afford to pay for the produce of the plantations. Such plantations can never be a financial success.

62237. But is it the aim and object of your department to make money or to serve the public?—The policy is, I take it, to make revenue and as far as possible to serve the public as well.

62238. And where these two interests are incompatible?—We serve the public.

62239. *Sir Thomas Middleton:* What is the character of the vegetation in your unclassed forest land? Is it mostly grass?—It varies very greatly. In Tenasserim it is dense evergreen forest; in the dry zone it is the driest scrub jungle you could imagine, and there is every kind of forest in between these two limits.

Mr. S. F. Hopwood]

62240. What is the reason for leaving it as unclassed forest in Tenasserim? Was it not profitable to make it into a reserved forest?—That area has only just been surveyed; it will, within the next ten or fifteen years, all be explored and proposed as reserved forest.

62241. It is a potential source of additional teak land?—Not teak; there is no teak. It is evergreen forest. It is a potential reserved forest but not of teak.

62242. What are the evergreens that flourish down there?—Mostly *dipterocarps*.

62243. And if these forests were cleared, would the climate be suitable for teak?—No teak grows in the Tenasserim Division or the Mergui Division.

62244. What are the limits of teak cultivation in Burma?—It does not grow well over about 2,800 feet.

62245. Outside the teak limit what are your main timber trees in Burma?—Oaks and chestnuts, but we do not use them much as timber.

62246. Have you any coniferous forests?—Yes, they are mostly in the Shan States.

62247. Are these coming into use?—No, they are of very little value.

62248. What conifers are there?—*Pinus Khasya.*

62249. That is the same as is found in Shillong?—I do not know.

62250. You have already told us that your efforts to provide fuel reserves for people who do not want them have not been very successful?—No, the result has been disastrous. Large numbers have already been disforested.

62251. Were those enclosures for natural regeneration or did you plant them?—We did planting. We attempted to plant large areas, but it was a hopeless failure. Government have now ruled that no reservation is to be made that is not in accordance with the wishes of the population.

62252. *Mr. Reynolds:* Reservation for local supplies?—Yes.

62253. *Sir Thomas Middleton:* From the figures you have given us it would appear that about ten per cent of the cattle in Burma are making use of your forest grazing?—Yes, and there is an increasing number of cattle which graze in our reserves illicitly.

62254. Where are these grazing reserves situated? Are they widely scattered?—I think they are scattered over the whole of Burma. I should think there is hardly a reserve which has not got some rights to grazing in it.

62255. I understand that, in quite a large proportion of your reserved forests, you do not admit grazing of any sort?—That is true.

62256. You have got roughly about eighteen million acres of reserved forest and grazing is permitted only in about 4,500,000 acres?—21,000 square miles are closed to all animals for the whole year.

62257. My question related to the open reserved forests?—These open reserved forests available for grazing will be found all over Burma.

62258. Do the unclassed forests offer good grazing as a rule?—Fairly good, I should say.

62259. What about the evergreen tracts?—The population is extremely small.

62260. And the dry tracts to which you referred?—The population is large.

62261. What about the supply of grazing in your unclassed forests in the dry areas?—These areas are populated by large numbers of cattle belonging to natives of India. The natives of India come into this Province in increasingly large numbers and they keep a lot of wretched, miserable and half-starved cattle.

62262. That is from South India I suppose?—No, I think they come mostly from Northern India.

62263. Do any Nepali herdsmen find their way here?—Yes, we have them at Mogote and round Maymyo. They came from the Gurkha regiment which was stationed at Maymyo, after obtaining their discharge. The keeping of half-starved cattle is a great menace and a curse in Burma. It is a question more for the Veterinary and the Public Works Department than for the Forest Department. These miserable cattle undoubtedly spread disease and have become a frightful nuisance along the roads. These people seem to keep them from choice all along the roads and if you attempt to motor from, say, Rangoon to Prome, you will find these miserable-looking cattle the whole way. I do not know what they keep these cattle for.

62264. In Assam the Nepali herdsman keeps a fairly good class of animal?—These are not Nepalis. The Burman is a peculiar man; the people in fact are pastoral, but they make no use of milk themselves. They do not milk their cattle or make butter or cheese, and they are most exceptional in that way.

62265. *Mr. Calvert:* Coming up to Rangoon the other day we found a large amount of silt going down the river, which suggests soil erosion. Would you say that soil erosion is being increased in Burma owing to the destruction of forests?—No, I would not say so.

62266. You have told Sir Thomas Middleton that your forests are fairly well scattered throughout the length and breadth of Burma?—Yes.

62267. And therefore labour is employed throughout the country?—Yes.

62268. Is that labour local village labour, or immigrant labour?—It is local village labour. The ordinary Burman may perhaps best be described as a husbandman owning a yoke or two of cattle and when he is not occupied in growing his rice crop, he is very glad to take up work in the forests. In fact almost the whole of the outturn of our forests is worked out by agriculturists.

62269. Is all your expenditure, which I see is about eighty-nine lakhs, distributed in wages?—I do not know what you are quoting from. If that is correct, the whole of it goes in wages.

62270. Has the Dehra Dun Research Institute proved of value to you?—Undoubtedly.

62271. Apart from their work on diseases, is their work likely to result in profitable use being found for forest products which have at present practically no market?—Undoubtedly.

62272. Do you think that the research work at Dehra Dun will tend to increase the opportunities you can point out for local labour?—I hope so.

62273. *Dr. Hyder:* Is there a lot of bats' guano in your forests?—Yes, in the Tenasserim Circle.

62274. Do you give facilities for extracting it?—We sell the right to collect it; we sell it by auction, as a rule, on a three years' lease.

62275. It is extracted?—Yes; it is a valuable product which is found throughout the Tenasserim Circle.

62276. Is any teak planting done by the department?—It is done with the aid of the agriculturists. They grow their crops, and they plant teak. They are given payment for planting at so much per hundred trees; and they do not pay capitation-tax for the years they are engaged in plantation work.

62277. *Mr. Reynolds:* Speaking of the more occupied parts of Burma, that is to say, excluding districts like Arakan and Tenasserim, would it be correct to say that reservation has been pushed to its practicable limits?—That is practically true with regard to the Hlaing Circle.

62278. Has it not been the deliberate policy of the Local Government to leave a small strip of unclassed forest between the edge of cultivation and

the edge of the reserves?—In many cases it is not a small strip; it is a very large strip extending over miles.

62279. But it has been the policy to leave a strip?—Yes.

62280. Would any attempt to reserve this strip be bitterly opposed, in your opinion?—It would be most bitterly opposed.

62281. Have not the attempts to reserve these strips in many cases been abandoned as a result of opposition?—That is true.

62282. If these strips were reserved now, do you think that they could be policed by the Forest Department without prohibitive cost—No; certainly not; we would require very heavy police expenditure.

62283. You stated, in answer to certain questions, that the forests were scattered pretty generally all over Burma. I suggest that the scattered blocks are not small blocks, but pretty big blocks?—That is true.

62284. They are not in small isolated patches, but in big blocks?—They are in big blocks.

62285. So that for grazing and for extraction by the villagers, it is the fringes only that are touched; they do not get deep into the blocks?—Yes, except for villages lying within the blocks.

62286. A village five miles from the forest will only touch, for extraction, the fringes generally?—Generally speaking, that is so.

62287. Taking the cultivated parts of Lower Burma, such as Prome, Henzada and Tharrawaddy, plantations which are fifteen or twenty miles away from the reserved forests are, practically speaking, of no advantage to these villages as regards extraction of forest produce?—That is so.

62288. They have to rely on purchasing these things through the ordinary means of trade; and these are extracted by villages near the forests for the purposes of trade?—Yes.

62289. This is fairly true of a great part of Burma?—Yes.

62290. The Local Government are prepared, I understand, to take up reservation of areas near a village for the local people of that village on certain conditions?—Yes.

62291. Provided the villagers agree to it?—Yes; the villagers must come forward; the Forest Department must follow, not lead, in a case of that kind.

62292. And they would have to pay something for the produce which you wish to put in the reserve?—Yes, they would.

62293. The term "unclassed forests" is extremely vague, is it not?—Yes; very vague.

62294. It may very well be that no more than a third of the area classed as unclassed forests is covered with forest, and the rest is scrub jungles and nothing more?—Yes; possibly a little more than a third.

62295. Has any enquiry been made with the idea of reclassifying them?—Yes, in certain districts.

62296. *The Raja of Parlakimedi:* What is the annual allotment you receive for forest development?—I could not give it to you.

62297. Approximately?—Our revenue is over two crores, and our expenditure is about eighty-three lakhs.

62298. You receive a very substantial amount for development?—We receive more than we can spend; we have no complaints on that account.

62299. May I know what the species are on which you concentrate for development?—Teak, *pyinkado, padauk, ingyin;* chiefly these.

62300. To develop these, what are the methods you adopt to enlist labour?—In the past where we had any major works on hand, such as road work (for which the Burman has a dislike), we had immigrant labour; but ordinarily we get local labour. There is no special method.

62301. Is it on payment of daily wages?—Yes; they get twelve annas per day.

62302. That is for men?—Yes.

62303. And for women?—There are no women working in forests of Burma.

62304. For clearing lines?—No; we do not make use of women's work.

62305. You wish to have continuous supply of labour; do you give them any concession to cultivate open areas in the forests?—Yes. In many divisions we have villages which fall under three heads; labour villages are the ones to which you refer; they comprise some 150 villages or so.

62306. Something like what they do in the Central Provinces; there they call them forest villages?—Yes.

62307. What rent do you collect from the cultivators for cultivation?—For cultivation inside the forests, we collect the same rate as prevails for the same class of land outside the forest; that rate is laid down by the civil authorities; it varies, of course, enormously.

62308. No concession is given to them, I suppose?—Yes; the cutters have to plant our trees and they do not pay their *thathameda* for a period of three years (*thathameda* is the capitation tax); that is about the only concession they have. We find little difficulty in getting these people to come into the villages; they look on it as a privilege, without any special concession.

62309. Are you satisfied with the available arrangements for making use of the forest produce?—I am.

62310. Do you think they have been tapped to the full for revenue purposes?—Most certainly not. If we were to lay railways and work them more commercially we could extract a larger quantity of timber.

62311. With better roads there will be better facilities for marketing?—That is true; it is a question of transport. But the country is mostly extremely difficult, and it would not pay to lay roads and railways with the prevailing prices for timber.

62312. You say in the very beginning of your written evidence: "I am of opinion that forest lands as such are at present being put to their fullest use for agricultural purposes"?—That is true.

62313. Does that mean that you allow the cultivators to get into the reserves and provide themselves with the required material for making their agricultural implements on concession terms?—No; I do not mean that. I mean that where land will yield more under cultivation than under forest crops, it is being put under cultivation. I am talking of land in reserved forests which is capable of permanent cultivation; and I say that such land has nearly all been placed under permanent cultivation.

62314. For extraction of materials for *bona-fide* agricultural uses, are any concessions given to them?—They are allowed to extract from unclassed forests free of any payment whatever.

62315. Do you allow them to extract even superior varieties?—They are not allowed to take teak and certain reserved timber. They can extract all other trees for their *bona-fide* domestic and agricultural purposes.

62316. *Sir James MacKenna:* Are not the rights of villagers actually defined in the settlement of reserve forests?—They are.

62317. Have you any views as to how these wandering herds of half-starved cattle could be dealt with?—I have. These herds consist of very large numbers of animals. The owners of them do not even know how many they have got themselves, and if a tiger kills a few they do not miss them. I would choose a suitable proportion of which the herd might consist, say, twelve animals, and I would allow them that number free, or nearly free. Above that, I would charge them very heavily, say, three rupees per head per month.

62318. Would that not be discriminating taxation as against natives of India? You would exempt large herds of *bona-fide* agricultural cattle?—These people are not agriculturists. They are men who come over here

and keep very large numbers of cattle. They graze them, if they can, in the forest reserve, and they pay no taxes whatever to the Burma Government; that is my point.

62319. *Professor Gangulee:* How are your subordinate officials trained?—We have a large forest school at Pyinmana in Upper Burma. There we train two classes of students. The Provincial Service men are trained at the Rangoon University.

62320. *Sir James MacKenna:* There is a Faculty of Forests in the University?—Yes.

62321. *Professor Gangulee:* In the school which you mention, what is the qualification for entrance?—There is no entrance qualification to the lower classes at all, except that the man must be a permanent forest official. He must be drawing (I speak from memory) thirty-five rupees a month or more.

62322. He enters the school during the term of his service?—During his permanent service; he is selected by the Divisional Forest Officer for deputation to the school.

62323. How many of the superior officers are trained at Dehra Dun College?—None are trained there now. They are trained at the Rangoon University now.

62324. You do not recruit even for your Superior Forest Service any man from the Dehra Dun Institute?—Not now. They are either trained at Oxford for the Superior Service, or they are trained at the Rangoon University for the Provincial Service, or for the Subordinate Service in the school at Pyinmana. No Burmese forest officials of any kind are now trained at Dehra Dun.

62325. What service does the Institute at Dehra Dun render to you?—It is a scientific service. For example, we have in our depot here, a very complicated kiln for drying timber. We obtain our advice from Dehra Dun. The specialists from Dehra Dun came over here to show us how to work the kiln. Frequently we have visits from the Dehra Dun Botanist and other specialists. We collect botanical specimens and have them identified at Dehra Dun.

62326. Is any research in forest products or forest problems being carried on here?—Yes.

62327. Have you a research station in the Province?—I would not call it that, but we do tackle small problems. For example, *chaulmoogra* oil, which is very useful in leprosy, is being gone into. We collected last year 135 specimens, and we had the oils analysed through the kindness of Professor Peacock at the University here. I would not call it a research institute, or give it a name like that.

62328. In answer to Question 19 (*e*), you say "I do not consider that there is any opening for schemes of afforestation in the neighbourhood of villages." What are the difficulties there? Is there no area available?—In order to afforest anything, you must have some kind of tenure of the land; otherwise, when you have grown your crop, anybody, under the present rules, can come along and cut it down. So, that implies reservation. If you attempt to make a reserve in the neighbourhood of these villages in order to carry out this afforestation, you will find immense opposition from every villager. It means taking away part of his grazing land or part of the land from which he derives his minor forest products.

62329. That is the chief difficulty?—I would not say that. The land often does not lend itself to growing anything. The areas are often barren stony hills and the crop would be of very small value when you had grown it.

62330. Is there any land in Burma which would lend itself to afforestation, and which is not already reserved?—Yes, there are considerable areas, but they are gradually being reserved under the policy of Government.

62331. In the note * that was given to us by the Government, Mr. Watson tells us: "The ideal position would be to have portions of the communal

* Not re-printed.

lands set aside for the production of forest crops and managed by co-operation under State supervision." Is anything being done to realise this ideal?—I do not think that anything is being done in that line.

62332. Do you think that Government should direct its attention towards that ideal?—I do not think you could possibly get any further, with such intense opposition from the villagers. We have had attempts in Henzada to carry it out. We planted up large areas in Henzada, but they cut them down.

62333. It may be an ideal, but it is not practicable?—It would be, with the co-operation of the villagers; but, the villager being what he is, it is not practicable.

62334. What steps are being taken to win the co-operation of the villagers? —I do not think any.

62335. Are the transport facilities in the forest areas satisfactory?—The transport facilities are improving every year. The Burma Railways have a very large programme, and they are increasing the length of the lines every year.

62336. That is with reference to railways. What about forest roads?—Forest roads are made every year.

62337. Is the expenditure met from the Forest budget, or from the Public Works Department budget?—From both. The Forest budget also provides for the extension and repair of roads.

62338. Is any deliberate or wilful damage done by the cultivators living near the forest tract?—None; we are on friendly terms with them. They make their money out of us, and we keep in their good books, too.

62339. *Mr. Kamat:* Are there any industries of a manufacturing character, apart from forest products, which you are developing?—There are large numbers of industries.

62340. Are they of a manufacturing character?—Some of them are somewhat of a manufacturing character, especially the saw mills which convert timber into planks.

62341. Are there any others?—Yes, especially with regard to minor forest produce. Cutch and lac are made in very large quantities, but they are not finished products.

62342. What use are you making of your bamboo?—We sell very large numbers of bamboos yearly. Almost every Burmese house in the districts is made of bamboo. Frequently the roof is made of bamboo. The Burman uses bamboo from the cradle to the grave.

62343. No other finished product is made out of bamboo?—Mats are made out of it. Immense numbers of bamboo mats are made use of for the walls of houses and for sleeping on.

62344. Is no paper manufactured out of it?—There is no pulp manufacture in Burma at present. We have had books made out of bamboo paper as samples, in order to induce people to come along and take up bamboo pulp propositions. I understand, however, that unless you can put your pulp at your port at £7 10*s.* a ton, you cannot make a profit.

62345. You refer to some officers of your Forest Service being sent to Oxford?—They are trained at Oxford. Some of them are trained at Oxford before they come here.

62346. Is there no system of sending out some of your men, already in the service, for any such training?—It is very exceptional. Some Burmans have been sent, during the last three or four years, to take an additional training at Oxford, but it is rather exceptional.

62347. There is a remark in your memorandum which I should like you to explain and expand, if possible. It is stated that any increase in the fodder supply is the duty of the Agricultural Department. What, exactly, do you mean by that?—We grow timber mainly; we do not grow grass. The forests are reserve forests, they are not grazing grounds.

62348. Is there no system, in this Province, of pressing or baling the grass and selling it by auction?—There is no such system at all. The

Burman does not cut grass; he turns his buffaloes and cows into the forest to eat it. He does not cut it and bale it and carry it to his house. He cuts his paddy straw, and the cattle eat the straw, but not the cut grass as a rule.

62349. In other Provinces, grass for fodder is pressed, baled, and transported by the Forest Department to very long distances for the use of the agriculturist?—Yes, but the Burman does not go in for immense herds of cattle like they have in India. He has a few very well kept and well looked after cows and buffaloes, and in consequence he is able to feed them better than if he kept a very large number.

62350. *U Ba Cho :* The streams coming down from the hills into the Irrawaddy and Sittang rivers were used by the cultivators for their lands. They had water from the streams for the crop, especially paddy, both in the beginning and late in the season. These streams are now being used for floating teak logs?—Yes.

62351. Naturally, it will be detrimental to the interest of the cultivator to utilise them for floating the timber?—No.

62352. Do you not think that the cultivators suffer for want of water?—I do not agree at all. In the Myitmaka Extraction Division, through the activities of the Forest Department, enormous areas are reclaimed every year and given over to the cultivator. I think the cultivator benefits immensely by the activities of the Forest Department in training these streams.

62353. There are many streams that are being used by the cultivators for watering their own lands?—Yes.

62354. They may be numbered by hundreds?—Yes.

62355. In every case where the channel is used for drifting down the logs the cultivator cannot use it for irrigation?—I have never heard of such a thing in my life. For instance, the main streams in the Minbu which irrigate the whole of the Minbu Division, are used for floating logs and have been for time immemorial, but they are the main irrigation streams of the district and they irrigate thousands of acres.

62356. I am talking about the streams that enter into the river Sittang? —Will you kindly tell me in what district that is.

62357. The cultivators get the water by putting temporary *bunds* across the streams for irrigation purposes?—Yes.

62358. If you use these streams for floating down logs, the temporary *bunds* set up by the cultivators will all be taken away?—This is something entirely new; I have never received any complaints of that kind. Could you kindly tell me what district it is?

62359. In Toungoo district there are very serious difficulties?—I held charge of Toungoo Division for over a year and I never heard a word about it; never received a single complaint on that score.

62360. You heard about the Flood Enquiry Committee appointed by the Legislative Council?—Yes.

62361. Many cultivators came forward and gave evidence, before the Flood Enquiry Committee, against the big timber firms monopolising the use of the streams which were formerly used by the cultivators for the irrigation of their own lands. Have you heard of that?—No, I am extremely surprised to hear that there have been any complaints on that score.

(The witness withdrew.)

Captain S. R. RIPPON, M.R.C.V.S., I.V.S., Superintendent, Civil Veterinary Department, Burma, in charge of South-eastern and South-western Circles, Rangoon.

Replies to the Questionnaire.

QUESTION 15.—VETERINARY.—(*a*) The Civil Veterinary Department should be independent.

(*b*) (*i*) District councils are responsible for the maintenance of dispensaries, *i.e.*, purchase of drugs and instruments, and for the rent of the building either in whole or in part.

The assistant in charge is paid out of provincial funds.

The system does not work well, because district councils are averse to going to any expense in order to effect improvements, mainly because the municipalities refuse to bear part of the cost.

(*ii*) No.

(*iii*) Yes.

(*c*) (*i*) Taking one example, *viz.*, Prome. As the average daily number of animals treated at this disposary last year is less than two, I should say that agriculturists do not always make full use of dispensaries.

Two things would tend to remedy this, *viz.*—

(*a*) Greater enlightenment of the agriculturist regarding Western methods of treatment.

(*b*) Better equipped dispensaries in charge of more highly trained assistants.

(*ii*) No.

(*d*) The obstacles met with in dealing with contagious diseases are as follows:—

(1) Shortage of staff.

(2) Late submission by headmen of outbreak reports.

(3) Headmen being either ignorant of the Cattle Disease Rules, or neglecting to carry them out.

(4) Disinclination on part of many cattle owners to have their cattle inoculated.

(5) Refusal of Deputy Commissioners to close down certain cattle routes from neighbouring countries, until disease is actually introduced.

(6) Lack of police patrols to prevent smuggling of cattle along routes which are closed when disease has broken out.

I approve of legislation in connection with the matters mentioned in the question and can suggest no other means of effecting a sudden noticeable improvement so far as those matters are concerned.

(*e*) Occasionally.

(*f*) No fee is charged for preventive inoculation, except where municipalities or wealthy private owners are concerned.

The obstacles in the way of popularising preventive inoculation include—

(*a*) apathy, and in some cases antipathy, of the people;

(*b*) the fact that by the "serum alone" method cattle only receive temporary immunity;

(*c*) the occurrence of a small percentage of deaths after inoculation, with no compensation given, the people not being sufficiently well educated to understand the incubation period of rinderpest;

(*d*) during the ploughing season the people often cannot spare the time to make the necessary arrangements for inoculation.

(*g*) Certainly, further facilities for research into animal disease are desirable.

I advocate the setting up of provincial veterinary research institutions.

Not having seen the Muktesar Institute or knowing its present facilities, I am unable to express an opinion as to whether it also should be extended.

(*h*) I recommend that special investigations should be conducted by research officers in the Provinces as well as by officers of the Muktesar Institute.

(*i*) I do recommend the appointment of a Superior Veterinary Officer with the Government of India.

Such an appointment is necessary in order to co-ordinate the work of Provincial Governments in the control of contagious disease. This officer would also tour the Provinces, get to know the capacities of individual officers of the Veterinary Department and hence be able to advise the Government of India as to the suitability of these officers for various duties and appointments.

It would also release the Agricultural Adviser to the Government of India from duties which he is obviously unfitted and incompetent to carry out without reference to professional veterinary opinion.

Moreover, I consider that if the Veterinary Department is left under the control of the Agricultural Adviser, the Agricultural and Veterinary Departments being so to speak amalgamated, there would be a risk of matters concerning the subordinated department not receiving sufficient attention. As a slight indication of this tendency I may mention that in an article on "Progress in India", written by the Agricultural Adviser, which appeared in the *Daily Telegraph* of April 3rd, 1927, although the subject of cattle-breeding was touched upon, no mention whatsoever was made of the Veterinary Department.

Oral Evidence.

62362. *The Chairman:* Captain Rippon, you are Superintendent of the Civil Veterinary Department in Burma in charge of the South-eastern and South-western Circles, Rangoon?—And in charge of the Veterinary School.

62363. I think at the moment the Veterinary Department in Burma is subordinate to the Agricultural Department, is it not?—That is so.

62364. Do you think that is a good plan?—No, I would rather see it independent.

62365. Do you know what the policy of Government is in this matter?—I believe it is only a temporary arrangement that we should be under the Agricultural Department.

62366. In answer to Question 15 (*b*) (*i*), you give it as your opinion that the present administration by district councils, of veterinary dispensaries in the districts is not working satisfactorily. Have you any alternative to suggest?—The alternative seems to be that it should be provincialised.

62367. To take power and responsibility away from the district boards and hand it back to the Province; is that it?—Yes.

62368. Do you see any political difficulties attaching to that suggestion?—I do not at the moment.

62369. I am not quite sure of my construction of the last sentence of your answer to Question 15 (*d*). How is legislation, if that is your meaning, going to effect a sudden noticeable improvement in the matters you are dealing with there? Do you mean you think legislation would bring about improvement?—We have legislation in Burma now; we have the Cattle Disease Rules, 1914. I meant that I approved of those, with certain modifications which are now under discussion.

62370. You cannot suggest anything further?—No, nothing further.

62371. For these rules to be effective, policing on an important scale is essential; is that so?—I think so.

62372. Is that where the system is weak at the moment?—Yes, in my opinion.

62373. Have you used the serum-simultaneous method of inoculation against rinderpest in this Province?—Personally, no.

62374. Has it been used in the Province?—I believe it was used some years ago by the former Superintendent in charge.

62375. Have you your own views as to whether it would be a sound move to open a station for the manufacture of sera in Burma?—I see no objection to our maintaining a station if the funds were forthcoming.

62376. That is the difficulty, of course; it is a question of expense?—I think it would be very expensive; I do not know what the expense would be.

62377. It means a complete outfit for manufacturing a relatively small quantity?—Yes.

62378. In answer to Question 15 (*g*), you say you are in favour of the setting up of provincial veterinary research institutions?—Yes, I am.

62379. Probably, not having seen Muktesar, you do not wish to express any view about it; is that so?—I have never been to Muktesar, and do not wish to express any view about that institute.

62380. Do you think that, on general grounds, the maintenance of a central research station is a sound policy?—Yes, I think so.

62381. And, of course, as a policy, it is not at all repugnant to the setting up of effective research institutions in each Province?—No.

62382. Is your department responsible for improving the breeds of cattle?—No, that has now been handed over to the Agricultural Department entirely.

62383. I think horse-breeding has been transferred to the Military Police? —That is so.

62384. Do you take an active interest in that?—No.

62385. I mean a personal interest?—Not out here; I have not had the time nor the opportunity to devote myself to it.

62386. To turn to education: you are about to occupy a new veterinary college which is to replace the old veterinary school at Insein; is that so?— Yes.

62387. With a three years' course and a High School Final as the standard of admission?—Or tenth standard vernacular or Anglo-vernacular if the others cannot be obtained.

62388. Are you satisfied with those entrance qualifications?—Yes, with the future qualifications, not with the present.

62389. The ultimate objective is the recruiting and training of the Superior Provincial Veterinary Service?—Yes.

62390. Have you formed any view as to how far away from that consummation you are at this moment?—It is very difficult to form any very definite idea.

62391. It must take time?—It must take a very long time, I think.

62392. Inside ten years?—I should say certainly not.

62393. Have you seen much of Burmese veterinary officers trained in Europe?—I have not seen any.

62394. Are there many such in the Province?—There are none at the moment; there are two State scholars at Home now undergoing a course of training.

62395. So that, in the meantime, training, so far as higher branches go and as regards the Burmese side of the service, is in its elementary stage? —Yes.

62396. I meant to ask you, when I broached the question of the improvement of breeds of animals, whether your department was meeting any demand for castration?—We do a few castrations at the Insein Veterinary School, but none in the districts.

62397. Do you use the Italian method?—We have done one or two by the bloodless method this present year; the instrument was sent down to Moulmein to do some on the agricultural farm at Mudon and the result was quite satisfactory.

62398. How old was the animal?—Three were done; they were two or three years of age.

62399. That is rather an important factor in this country: castration is usually done rather late in the animal's existence, is it not?—Yes.

The Commission then adjourned till 10 a.m. on Friday, the 4th November, 1927.

Friday, November 4th, 1927.

RANGOON.

PRESENT:

The MARQUESS OF LINLITHGOW, D.L. (*Chairman*).

Sir THOMAS MIDDLETON, K.B.E., C.B.
Sir JAMES MACKENNA, KT., C.I.E., I.C.S.
Mr. H. CALVERT, C.I.E., I.C.S.
Raja Sri KRISHNA CHANDRA GAJAPATI NARAYANA DEO of Parlakimedi.
Professor N. GANGULEE.
Dr. L. K. HYDER.
Mr. B. S. KAMAT.

Mr. H. O. REYNOLDS, I.C.S.
U BA CHO. } (*Co-opted Members*).

Mr. J. A. MADAN, I.C.S.
Mr. F. W. H. SMITH. } (*Joint Secretaries*).

Capt. S. R. RIPPON.

Further Oral Evidence.

62400. *Sir Thomas Middleton:* Are you in charge of the school at Insein?—Yes.

62401. Has the course at that school recently been reorganised?—A new syllabus has been drawn up. It has not yet received the sanction of the Government. So far as I know, it has not yet been put up to Government; it has been put up to the head of the department; I drafted a revised course very recently.

62402. Does that course cover a three years' curriculum?—Yes.

62403. Have you got a copy of the syllabus?—I expect there is a copy in the office of the head of the department. I have no copy in mine.

62404. We can apply to him. I think your course is for the training of the Veterinary Assistant only?—That is so.

62405. And an Inspector would be expected to have taken a longer course in one of the Indian colleges?—Not all the Inspectors. Some of them are merely promoted, in the ordinary course of events, from the district staff.

62406. In what respect does your course differ from the course in Indian colleges? I am aware of the fact that the entrance qualification is lower?—Up to the present it has been the seventh standard vernacular. We have not admitted any High School Final boys yet. That has only just received the sanction of Government. The first batch has not yet been admitted.

62407. All the training has been in the vernacular?—It has all been in the vernacular.

62408. Is there any proposal under consideration that the training should be in English?—It is proposed to make it English if it is possible, if we can get English-speaking students. Then the lectures will be in English. If we cannot do that we shall have to fall back upon the vernacular again.

62409. You are following the course of development that took place in the Punjab Veterinary College?—We want to run it on somewhat similar lines, if possible.

62410. At what college did you study yourself?—The Royal Veterinary College in London.

62411. There the normal course is four years?—Yes.

62412. A good many take a five-year course?—A certain percentage do.

62413. I am not referring to those who failed to pass. I am referring to those who study an extra year for post-graduate work?—A certain number take the B.Sc. That usually entails another extra year's study. A brilliant man can do it all in four years, but that requires a brilliant man.

62414. Have you moved about Burma much since you came here?—For the first eighteen months I was in Rangoon all the time. Since the beginning of 1926 I have been able to tour a certain amount in Lower Burma. My circle comprises the whole of Lower Burma and the Arakan sub-circle in addition. I have toured in this area a good deal.

62415. Do the cattle in Lower Burma come mainly from Upper Burma?—The breeding centres are in the dry zone.

62416. Have you recognised any definite types of breeds of cattle as coming from Upper Burma?—The Burmese bullock is a definite type in itself.

62417. In a large herd, could you pick out Burmese bullocks? Is the type sufficiently defined?—Yes.

62418. One witness told us that a large number of Indian cattle get into the forest areas in certain parts of Burma? Have you seen any of these cattle?—I have seen large herds of Indian cattle roaming along the roadside on my tours.

62419. I am now thinking of conditions in Middle Burma?—No; I have not toured in those parts.

62420. What I wanted was to get some information as to the origin of these Indian cattle that reach Burma?—I could not tell you that.

62421. *Mr. Calvert:* Evidence has been sent in to us about an experiment, in Rangoon, of cross-breeding local cattle with English pedigree bulls? Do you know what finally happened to that?—I do not think it took place in my time.

62422. Other evidence has been sent in to the effect that your Veterinary Assistants are paid starvation wages. Would you like to comment on that at all?—The initial pay for some years has been forty rupees per month. I do not consider that they are adequately paid.

62423. Is that point being taken up?—Yes, the pay has recently been revised. The existing incumbents now start on a scale of pay of fifty rupees a month. The initial pay for the High School Final men will be eighty rupees in future.

62424. A rather sweeping charge has been made against some of the veterinary staff, which you might like to tell us about. It is that Veterinary Assistants make false reports about their touring and that they demand money for serum inoculation?—Certain cases of false touring expense statements have been brought to my notice, but I have not come across any cases where serum has been charged for.

62425. *Dr. Hyder:* Has any work been done on the diseases of elephants?—No research work has been done by the Veterinary Department on any scale up to the present.

62426. You are investigating this matter?—No investigation is taking place, up to the present moment, on elephant diseases.

62427. What kind of animal do they chiefly use for the trans-frontier trade between Siam, Indo-China and China?—I believe that in the north it is largely ponies and mules but down here on the south-eastern frontier, as far as I know, it is cattle principally.

62428. What about the cattle?—They are Siamese cattle.

62429. You have not got any pack animals of your own in Burma?—Very few.

62430. *Mr. Reynolds:* In these herds of Indian-owned cattle which you have seen along the roadside, there are generally two or three bulls to a large herd?—Yes.

62431. These are not Burma-bred bulls, I take it?—No; they are usually an Indian breed.

62432. Are they imported?—Yes.

62433. Are they imported by sea to Rangoon or do they come across the border?—I do not know. There is a quarantine station in Rangoon. I presume, if they came by sea, they would be quarantined.

62434. You do not know whether they come by sea or overland?—No.

62435. The bulls are foreign?—A good many are foreign. There are a certain number of Burmese bulls.

62436. I have never seen any bullocks of any age in these herds. Do you know what happens to the bullocks? Are they sold for ploughing?—I do not know whether they are largely sold for ploughing. Most of the plough bullocks come from Upper Burma. These herds largely consist of rather poor looking cows.

62437. I was wondering what happened to the bullocks?—I expect a certain number find their way to the butcher.

62438. Are the cows imported cows or local cross-bred cows?—A certain number are cross-bred, certainly, but I believe that many are imported.

62439. *Professor Gangulee:* You told us that you send your students to the Calcutta Veterinary College for training. Do you give them stipends? —They receive a stipend at the College.

62440. How many such students have you sent already?—In my circles I have five Inspectors and two Deputy Superintendents who have received their training at Calcutta. There are a certain number in Upper Burma. That is outside my charge.

62441. Do you send your students to any other place besides Calcutta?— So far as I know, they have all gone to Calcutta.

62442. When you develop your Veterinary School into a college, do you intend to train these men in your college? Is your standard high enough as that?—I do not think they will be able to take up the Inspector's post straightaway. They will reach that by promotion in the ordinary course of events.

62443. If the training can be given, it will be given in the new college? —What we want to do is to train a higher standard of Veterinary Assistant.

62444. In the proposed Veterinary College, you are going to have laboratories designed both for teaching and research?—Yes; that is so.

62445. How many officers at the present time are engaged in research?— None.

62446. When the laboratories will be equipped, you will have some officers engaged in research work?—Government have sanctioned the appointment of two research officers. I understand that one is arriving shortly. The other one I have no knowledge of.

62447. Since the Agricultural Committee of 1925 reported, have you increased the number of veterinary dispensaries?—No.

62448. With the passing of the Rural Self-Government Act of 1921 do you think that the administration of the veterinary dispensaries has become difficult?—We have only four at the moment, not counting the Veterinary School at Insein with which a hospital is combined. There is room for extension but the difficulty appears to be that although many animals come from within municipal limits, most municipalities refuse to bear any of the cost of dispensaries. It falls upon the district councils.

62449. At the present time, the control of the Veterinary dispensaries is in the hands of the district councils?—It is.

62450. Is that system working satisfactorily?—Not very well because they cannot provide enough money to run them on proper lines.

62451. It is not the fault of the administration. It is probably due to their not having enough money?—I think so.

62452. You told the Chairman that you want to provincialise dispensaries? —Yes, to bring them entirely under the control of the Veterinary Department.

62453. If you do that, how do you propose to educate local bodies, such as the district councils, in matters relating to veterinary work. You have given them some responsibilities and some power now, and you want to take those away?—I do not think that their responsibilities in connection with veterinary dispensaries are very great. That does not entail any control over contagious disease, or rather very little, if any. Just a few minor injuries and diseases in the ordinary way are treated at the dispensaries.

62454. So you propose to have the district councils interested in the veterinary dispensaries?—They ought to be interested in them.

62455. At the present time, I understand the responsibilities of exercising control over them is vested in the district council?—It is.

62456. Do you want to keep to that arrangement, or do you want to alter it?—As it does not seem to be working very satisfactorily I consider it should be taken away from their control at the present time. Later it might be given back.

62457. What is the system followed in relation to the reporting of an outbreak of epidemic disease?—The report, in the first case, is made by the cattle-owner to the headman who sends it on to the Township Officer. The Township Officer informs the Deputy Commissioner through the Sub-Divisional Officer, and at the same time he informs the Veterinary Assistant who is then supposed to go to the spot and investigate the outbreak.

62458. Could you give us an idea of the actual time that elapses from the outbreak of a disease till the report reaches headquarters?—It varies considerably. Some cases are not reported for two or three months after the outbreak has started.

62459. Have you any proposal to make as to how this system of reporting can be expedited?—No, the existing arrangements are, I think, adequate if they were carried out.

62460. They are not carried out properly?—Not in every case.

62461. I think it was recommended by the Agricultural Committee of 1925 that the actual breeding of cattle should be the concern of the Veterinary Department and the distribution of the breeds evolved should be the concern of the Agricultural Department. Do you agree with that proposition?—I think, at the present time, the Veterinary Department has quite enough to do in dealing with contagious diseases, and breeding itself might be left to the Agricultural Department.

62462. So you do not agree with the recommendations of the Agricultural Committee?—With the present staff, I do not think it could be done.

62463. It has also been proposed by that Committee that a standing advisory committee, not exceeding five members, should be formed to advise Government in stock-breeding. Do you know if anything has been done in that direction?—So far as I am aware, nothing has been done.

62464. Is there any advisory committee to advise Government on veterinary questions?—No.

62465. Do you think that this entrance standard that you propose is satisfactory?—I think it would be a great improvement on the present standard.

62466. Have you worked out the cost per head that would be involved in giving this veterinary education?—No, I have not worked it out.

62467. *U Ba Cho:* Could you give me the average attendance in your school in Insein for the last three years?—About twenty-three; we have now thirteen. We started the year with twenty but seven have left for various reasons. We have only had one class passed out since 1925.

62468. Do you mean to say that the total of all the first, second and third year students comes to only thirteen?—There is only one class now and that is in the second year at the moment.

62469. Are the students vernacular or Anglo-vernacular boys?—The majority are vernacular; two or three are Anglo-vernacular.

62470. So the instruction must necessarily be given in Burmese?—Yes.

62471. You have text-books on veterinary science for these boys, I take it?—There are no text-books in Burmese.

62472. Then how are you teaching them?—The present staff of the school consists of myself, a Deputy Superintendent who has now been made Assistant Principal, a Veterinary Instructor, and a Veterinary Assistant, that is to say, four altogether. All the members of the staff have a very good knowledge of English which is quite sufficient to enable them to read intelligently the veterinary literature written in English. Therefore, they can keep their knowledge up to date and impart it in the vernacular to the students.

62473. You yourself do not do any teaching I take it?—I occasionally give a lecture, but I have very little time to do so. I usually devote Saturday, which is a holiday to this purpose but then I have to go out on tour for certain periods, and there is my own circle office work to do.

62474. For some time to come, you will have vernacular boys coming to the school?—The present class has another year and six months to go. The next batch will probably be the High School Final batch.

62475. But you also allow vernacular boys to come to the school?—That is an alternative.

62476. So, I say, it is quite possible that some vernacular boys will be coming to the school for some time further?—Yes.

62477. Are you making any attempt to have text-books in Burmese?—No.

62478. You were talking about the supply of serum. The serum cannot be kept for any length of time?—No.

62479. You send for the serum only when you anticipate an outbreak of rinderpest in the Province? Of course you have a small supply always but that is not enough, and you are required to send for large supplies whenever the necessity arises?—Yes, but I think I can safely say that inoculation is being done every month. There are always outbreaks in some part of the Province.

62480. But in case of a serious outbreak you find that sometimes the supply of serum has run out, and you naturally find some difficulty in obtaining quick supplies from Muktesar?—Yes, sometimes a consignment of, say, forty cases would be sent out in two parts, the first part arriving a week before the second part.

62481. So that when you really want forty cases and only twenty have arrived, you are faced with a great deal of difficulty?—Inoculation would have to be held up for the time being.

62482. Do you not think that we should have a serum depot in Burma?—I see no objection to that being done, provided funds were forthcoming.

62483. Have you any idea as to whether it would be very expensive to have a serum depot in Burma?—I think it would be very expensive, compared with the amount of serum that would be required. It would also require a staff, in addition to the buildings and the cattle.

62484. Do you not think that the number of cattle and buffaloes in Burma would justify the incurring of the necessary expense of the opening of a depot?—It might, but I would not like to say so definitely.

62485. So far, you have no travelling dispensaries?—Each Veterinary Assistant, when he goes out on tour, takes with him a touring chest which may be called a travelling dispensary. He keeps in it a certain quantity of medicines calculated to last him throughout his tour. His chest is usually carried by a coolie or by boat or by some other conveyance.

62486. But there is no regular travelling dispensary as we understand it?—No.

62487. As you know we have a large number of elephants working in the forests?—Yes.

62488. The mortality amongst them is pretty high, due to anthrax and other epidemic diseases?—Yes.

62489. Have the Government made any attempt to combat this disease amongst elephants? Has anything been done?—I think this is a question which requires a lot of research and Government have sanctioned a research officer to investigate diseases of elephants.

62490. This officer has not been appointed as yet, I take it?—Yes, he has not yet been appointed.

62491. *Mr. Reynolds:* There are three or four dispensaries which are managed by the district councils, are there not?—Yes.

62492. All are situated in municipalities?—Yes.

62493. And the district council has no control over the municipality?—I believe not.

62494. But a large proportion of the animals treated are, of necessity, animals from within municipal limits?—Yes.

62495. Do you know whether municipalities have ever been asked to contribute anything to the cost of these dispensaries?—Yes, they have been asked.

62496. Did they agree?—Some did, some did not.

(The witness withdrew.)

Mr. J. P. BULKELEY, M.A., I.E.S., Offg. Director of Public Instruction, Burma.

Replies to the Questionnaire.

QUESTION 2.—AGRICULTURAL EDUCATION.—(*viii*) (*a*) & (*b*)—Nature study and school plots are not a form of agricultural education but of general education and are perhaps even more important for non-agricultural than for agricultural communities. The chief difficulty in introducing them in Burma is that parents and children object to the manual labour they entail and to any school work which does not help children to pass public examinations. Government requires passes in certain examinations for admission to all grades of Government service and regulates the pay of clerks according to the examinations they have passed and this is largely responsible for the unpopularity of school-gardens and other "non-examination" subjects.

Propaganda, demonstration in selected schools, financial encouragement of teachers and skilled supervision will, therefore, be needed before the utility of school-gardening is generally recognised. The Government of Burma since 1st March 1925 has refused to spend money on these objects. Mr. Snow's note* at page 167 of the printed collection of papers explains that the decision was partly due to confusion in the minds of our Finance Committee between vocational and general education.

(*c*) School-farms are a device for combining general and vocational education. Such devices are seldom successful. True vocational education is best given intensively after general education has been completed. The value of the vocational education given at school-farms would probably be small as compared to their expense. As a method of general education, school-farms seem to me to be unsuited to this country because they cost too much for general adoption, and because there are few, if any, vernacular middle schools to which they could be successfully attached (*vide* Mr. Snow's note* on the Punjab Scheme at pages 168 to 176 of collected papers). Owing to the general prejudice in favour of literary education leading up to certificates [see above under (*a*) and (*b*)] they would be unpopular. I do not think children would be attracted except by the baits of stipends and free instruction in English, and the aim of children so attracted would not be to pursue agriculture but to escape from it.

(*xii*). The first need in connection with adult education in rural tracts is libraries. In a poor country literacy is of little value unless literates have library facilities. We need a central provincial library with a country branch dealing with independent local libraries and reading-rooms, and controlling travelling libraries. Independent local libraries and reading-rooms should be aided as at present by grants. Travelling libraries should consist of boxes of books circulated to honorary correspondents in villages for distribution (schoolmasters and other volunteers). The Baroda Library Scheme (described in the Baroda Library Handbook, 1926), seems generally suitable for adoption here. The chief difficulty in starting a library scheme in Burma is the absence of a provincial central library. Another difficulty is the comparatively small supply of interesting books for general reading in Burmese. I recommend also travelling magic lantern lectures, cinema shows and lectures. The films, slides and lecturers should be supplied by the Agricultural, Education and Public Health Departments. Until village institutions are established, the village school should be the community centre for lectures and distribution of books. The Members of the Royal Commission are no doubt acquainted with the recommendations for community work made by the Christian Missions Village Education Committee of 1920 and the work on lines recommended by that Committee of a Y.M.C.A. rural settlement at Ramanathapuram in Madras. We should aim at similar village activities in Burma, but the chief difficulty lies in the lack of voluntary agencies to undertake them. In some countries (*e.g.*, Czecho-Slovakia) the State has succeeded in establishing facilities for adult education directly, but the co-operation and often the initiative of voluntary agencies is usually essential. This is specially true in countries under foreign control like

* Not reprinted.

Burma. Christian Missionaries might undertake the work as in the Punjab, but I doubt if their services would now prove acceptable to villagers in Burma. I doubt whether indigenous voluntary associations will for some time to come undertake social service in villages. My conclusion is that adult education in villages, as well as other village community work, must probably wait for the establishment of a national form of Government or until district councils have sufficient enlightenment and funds to undertake it; at present they have neither.

QUESTION 23.—GENERAL EDUCATION.—(*a*) (*iii*) & (*b*) (*i*) (*ii*) & (*iii*). I shall deal with all these questions at once for they are closely connected. Because children leave school prematurely our expenditure on elementary education in Burma is largely wasted, and our vernacular schools are doing little to make the agricultural labourer or farmer a more intelligent citizen. There are several minor reasons and one principal reason for children leaving school so soon. Poverty, shortage of field labour, and absence of public opinion are all important factors. I have suggested above [under Question 2 (*viii*) (*a*) and (*b*)] that Government is to some extent responsible for the material view of education which leads to premature removal of all children who are not expected to become teachers or clerks. The chief reason, however, is bad schools. If school children were properly housed and taught they would stay longer at school. Children leave school mainly because they and their parents have justification for thinking that they are getting very little out of their schooling. I do not think the curriculum is much to blame or that much improvement will result from attempts to give it an agricultural bias. "Project" methods of teaching arithmetic, geography and composition will certainly help, but the need for them is only part of the general need for modern methods of teaching. In one respect the prospect is bright, for vernacular teachers all over Burma have recently been given greatly improved pay and we shall therefore get more intelligent recruits to the profession. As regards their training the prospect is more doubtful. So long as vernacular and Anglo-vernacular education is organised as at present on parallel, not horizontal lines, it will be difficult to introduce modern methods of teaching into vernacular schools.

Compulsory education is the only sure cure for wastage caused by children leaving school prematurely, but it can be only a gradual cure. Its successful introduction depends on public opinion and will, therefore, be facilitated by attention to adult education [*vide* Question 2 (*xii*)]. For financial and other reasons, it should probably be introduced only in areas prepared to levy an education rate. (This is a provision of the Madras Elementary Education Act of 1920.) This necessary step (*i.e.*, an education rate) will be greatly facilitated by the establishment of *ad hoc* local education authorities as in Scotland, Madras and the Punjab. There will necessarily be a large number of children unaffected for a long time by any Compulsory Education Bill which is suited to conditions in Burma. The chief utility of such a Bill will therefore be for some time to lessen the wastage in existing schools. Having no experience of compulsory education except in England, I have confined my remarks to its connection with Question 23 (*a*) (*iii*) and (*b*) (*i*) (*ii*) and (*iii*) of the Questionnaire.

Oral Evidence.

62497. *The Chairman:* Mr. Bulkeley, you are Director of Public Instruction in Burma?—Yes.

62498. We have, in Chapter XI of the series of papers * brought together by the Local Government, a statement of the position of education in Burma. I think it gives a very complete picture, but there are one or two questions about which I should like to ask you the details. In your experience, what is the attitude of the Burman population towards primary education? Is there any hunger for it?—I think there is. It depends on localities very much. There is a general desire for primary education, but it varies very much in different parts of the country.

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* Not reprinted.

62499. It occurs to me, having examined this question in other Provinces in India, and from what we see in Burma, that the position of women in Burma, as compared to their position in other Provinces of India, has an important bearing on the educational problem here. Are the women as well educated as the men in Burma?—Not so well educated; but compared to Indian Provinces, the education of women is more advanced. We have primary schools, which we call vernacular schools; the girls do not stay at school so long as boys either in that class of institution or in the Anglo-vernacular schools, mainly because they are not thinking of lucrative posts for which they will have to qualify by passing examinations. That is the chief reason which makes the educational figures for women lower than the figures for men.

62500. Have you had experience in other Provinces of India?—None.

62501. I am sure you have heard, over and over again, statements to the effect that the absence of any education among the great majority of the women in India has led to a great deal of relapsing into illiteracy on the part of the children who have left school at an early stage. It has been suggested that, if the mother were even partially literate, that tendency would be checked. Does your experience in Burma bear out that suggestion?—I think the illiteracy of the mother does, to some extent, encourage the relapse of the child into illiteracy. We have only about twenty-two per cent of our school population attending recognised schools. The vast majority of the population get their ability to read and write in unrecognised schools (monastic schools). Now, the monastic schools do not ordinarily accept girls. That is a feature of the situation which has kept back the education of the girls. I ought to have mentioned it before. Consequently, the mother of the village child is often illiterate. Perhaps there was no school to which she could go because she would not attend the local *pongyi* school.

62502. Where the mother in rural Burma is partially or wholly literate, is it found that books or newspapers or other reading materials are used in the home?—I am afraid I am not sufficiently acquainted with village life to answer with any certainty. In recent years there has been a considerable increase in the circulation of vernacular newspapers, and that circulation has brought reading material into a number of homes; but beyond the newspapers there is not much reading matter to be found in them.

62503. Is the demand for female education as active as the demand for male education?—I do not think it is, because the demand is to a great extent influenced by a desire to qualify for salaried posts which are open to men rather than to women.

62504. Is there any demand for adult education?—So far it has not expressed itself; but I think if you provided facilities for adult education you would find there was a demand. There is undoubtedly a great demand in the cities; but that is not a problem connected with the Burman; it is a problem connected with the Indians; in a city like this there is a great demand for adult education among them. The kind of adult education that they want is really vocational; they want English, especially to increase their chances of earning money.

62505. There is a large demand for the teaching of English in rural schools?—A very strong demand. I find it difficult to understand it; but there it is, undoubtedly.

62506. Can you account for it?—I can only account for it by the ease with which the people who knew a certain amount of English found posts, until comparatively recent years. There is also a prevalent feeling that a person knowing English goes up in the social scale.

62507. Do you think that the view that a person knowing a certain amount of English, has the right to expect a post, or at least is not expected to handle a plough, is likely to grow less when seventy-five per cent of the people in the rural areas are equipped with literacy?—I should think it is bound to grow less, but during the process there will be a lot of bitter disappointment.

62508. I think that idea has derived its strength from the fact that you mentioned, namely that only a small number of the people were available for posts which require a knowledge of English; but when the percentage of literate people increases, the number obtaining posts is bound to grow

less in proportion to the total of literate persons?—Yes; I would like to add something to what I said as to the causes of the demand. I think it is undoubtedly true that even a slight knowledge of English is of great help to people in the bazaars to send telegrams, to read telegrams and to understand accounts.

62509. I do not know whether you care to add anything to the statement in Chapter XI of the collection of official papers, as to the bearing of the monastical system of education on rural welfare? Did you prepare that paper?—No; I had nothing to do with it.

62510. It appears to be the view of the writer that monastic education suffers from very great limitations in certain directions?—That is true.

62511. Has any successful attempt ever been made to improve that particular type of school?—Many attempts have been made, with varying success. I was concerned with such attempts for many years and have spent much time in monastic schools. For the last fifty years we have tried to register these schools and to bring them into our system. About three years ago, a committee was appointed to go into the question of vernacular education, and the efforts to bring the monastic schools into our system was checked by the recommendation of that committee. Also, the new local educational authorities established under the Rural Self-Government Act of 1921 have, on the whole, been averse to registering monastic schools. There is a feeling among a great many Burmans that monks should not take too much part in secular affairs. I have known many monks who would be willing to register their schools, but they were deterred from doing so by public opinion.

62512. Is there any hope, do you think, that these monastic schools might improve substantially in their efficiency?—There is less hope now than five years ago, because, as Mr. Snow says somewhere in his note, the monks are more interested now in politics and other activities, and less interested in secular teaching, than they used to be, and the feeling that it is their duty to do a certain amount of teaching is, I think, not so common as it was. The question is bound up with any attempt we may make, here, to introduce any form of compulsory education; it is a complicated problem.

62513. You have a Compulsion Act in this Province?—No; we are thinking about it; in fact I have orders to prepare a scheme.

62514. In pages 165-166 of the collection of papers written by Government officials, reasons are given for the view taken that the Punjab system of agricultural training in schools is not suitable, at this moment of Burmese evolution, for transplantation into Burma in its entirety. Do you take the view that, in the future, something more closely approximating to the Punjab system, might be found suitable for Burma? Do you think it is a question of development?—I have an open mind on that question. I share Mr. Snow's view, generally against attempting to introduce definite vocational training in ordinary schools, though I would welcome any introduction of so-called vocational subjects which I was convinced would enrich the ordinary curriculum for purposes of general education.

62515. Are you satisfied in your own mind that the Punjab system, so far as middle schools go, is vocational?—No, I am not. In fact, I am assured that it is not.

62516. I misunderstood your answer?—I know the intention is not to make it vocational. But I am afraid if we introduce it here, at any rate, with the staff we have in the schools and for supervision, it would tend to be more vocational than generally educative. I would rather start with effective encouragement of school gardening, and work up to the farms by degrees, feeling our way.

62517. Your teachers would have to be efficient in the teaching of nature study, before you could have very much gardening?—It depends on what you mean by nature study. I think, if they garden well and get the plants to grow and the children to understand how they grow, the amount of nature study required is not very heavy. It depends on the degree of efficiency you have in mind. I would not require more efficiency in natural science than ought to be quite easy to give during training in Normal school.

62518. I am not suggesting any scientific equipment. I am thinking of the difficulty of teaching gardening to small children in such a way as really to interest them, really to excite their imagination, and really to leave something with them?—Yes, that is a difficulty.

62519. It always appears to me that that is not as easy as at first sight one might suppose. Meantime, nature study and school plots do not exist?—They exist, but they have been checked by Government's refusal of financial aid. We had a small department looking after school gardening, an Assistant Inspector provided by the Agricultural Department, with a small staff of trained Sub-Inspectors, and it was their business to carry on propaganda, demonstration and encouragement. My department concluded that the time had come to make a further step, and to encourage the teachers by some addition to their salary, if they taught school gardening well. We went up to Government three years ago, I think (I do not remember exactly), with a scheme to do that. The result was that our school gardening department, by which I mean the Assistant Inspector and Sub-Inspectors, were all taken away, and we have given no encouragement since, except a few prizes and seeds. We had made a promising beginning, but it was checked. We had done enough to show that school gardening can be made quite successful in Burma.

62520. Do you think that this prejudice against school plots is likely to wane, and that it may be more easy in future to get the necessary funds?—I think so; particularly if this Commission passed a recommendation to that effect. In this Province a scheme of the kind depends on the Finance Committee of the Legislative Council; it has to go before it, and it is difficult to revive a scheme once rejected.

62521. Are you familiar with the school at *Pyinmana?—No, I have not* seen it.

62522. Do you know about it?—*Not very much.*

62523. How about the aptitude of the Burmese for arithmetic? Is that considerable?—It is average; *it is no better* and no worse than in other races.

62524. Has the ordinary housewife any simple method of keeping her accounts?—I should say they are efficiently kept in her head; her head is very good at figures.

62525. *The Raja of Parlakimedi:* In answer to Question 2 (*viii*) (*a*), you say that these school plots are of very little use to the boys, because their aim is to qualify for clerkships. Do the plots appeal to the girls?—I did not say that the plots were of no use to the boys. I said that they were not as popular as one would like them to be, because of the feeling that the boys need literary subjects. You ask whether they appeal more to the girls. I do not think there is any difference.

62526. One knows how interested the girls are in flower gardening?—Both boys and girls are interested in gardening, if it is at all well done. That is my experience. I do not think there is much difference between the boys and the girls.

62527. As far as increasing the period of education for girls is concerned, would it improve matters if they were separated from the boys, if they had separate institutions and women teachers?—It would undoubtedly keep the girls longer at school and lengthen the *girls'* school life. There is a feeling in Burma, as in many other countries, that co-education works up to a certain age, but after that age, people very often take away the girls from school simply because there is no special girls' school. I agree with you there.

62528. Are there qualified women available to take up these appointments in girls' schools?—Yes, a large number. We have perhaps as many women teachers as men.

62529. So, you can start separate girls' schools?—The difficulty is mainly financial. So long as your village schools are, as at present, mainly confined to the first four standards, the necessity does not arise; the co-education system works well, besides being economical.

62530. Is there difficulty in getting the required financial aid from people responsible for the improvement of girls' education?—There is some difficulty in getting financial aid for any educational scheme; I have found it so since I became connected with education.

62531. Has there been any change since the Reforms? What is the financial effect of the Reforms?—The reform that has made most difference to village schools was the reform of local self-government, in 1921, when the district school boards, which are committees of the district councils, were placed in control of vernacular education. They have been sadly straitened for funds, except for a very few districts ever since then, and they have been unable to do much more than carry on the schools which they had.

62532. Can you give us an idea how many girls' schools there are at present, or are there none at all?—I could find the information quickly but I do not carry it in my head. However, the information I could get for you would be of little value. We are ordered by the Government of India to make certain returns, every year, of boys' schools and girls' schools, and we do so. As I have already said, the vast majority of our vernacular schools are co-educational, and so it happens that a school may be one year classed as a boys' school, because it has three more boys in it than girls, and the next year be classed as a girls' school because there are three more girls than boys. Hence, the classification is not of very great value. The village school is generally a co-educational school.

62533. There is no attempt made to have separate vernacular schools for girls and boys?—There are many attempts.

62534. To create separate institutions?—Yes; such attempts have generally been made in a village or small town, where there is an efficient monastic school; then the need arises for a separate girls' school; but there are not many of them.

62535. You have got the material for the teaching staff, and with more financial aid you could increase the number of vernacular girls' schools?—Yes.

62536. You say on page 135 "Because children leave school prematurely our expenditure on elementary education in Burma is largely wasted, and our vernacular schools are doing little to make the agricultural labourer or farmer a more intelligent citizen." Are there good translated books in the vernacular?—Good for what purposes?

62537. As sources from which people can improve their knowledge?—Yes. The books are not ideal, but they are certainly a great deal better than nothing and some of them are quite useful books. That is the reason why I stated that the wastage caused by children leaving school prematurely is the chief reason of failure.

62538. Do you see that the curriculum in those schools tends to give education an agricultural bias?—We have been doing something in that direction. The vernacular readers published in recent years have chapters on elementary science and agriculture. There is a good deal of that kind of matter. We might do more. My own opinion is, however, that you want the right teachers first, and that the best books in the world will not effect much unless you have teachers who understand how to adapt their teaching to local needs. Local needs in the way of teaching material vary with the environment of the children, and there is a great difference in the environment of the children in different parts of Burma, say, in the dry zone and the delta; so that one set of books would not suffice, even if books were sufficient in themselves to meet the problem. We want better trained teachers who understand modern methods.

62539. Do you insist on having a good percentage of trained teachers in your school?—We do our best to obtain them.

62540. In the training that the teachers have to undergo, is there provision for this bias teaching?—I wish there was more; the training is by no means ideal but we hope to improve it.

62541. *Sir James MacKenna:* Can you give the Commission any idea of the increase of expenditure on education in Burma in the last five years?—Yes, it steadily rose during the quinquennium, as the following figures will show:—

	RS.
1922-23	1,16,50,220
1923-24	1,35,41,419
1924-25	1,45,51,053
1925-26	1,72,41,598
1926-27	1,93,83,804

62542. So that in these five years it has increased from 116 lakhs to 193 lakhs?—Yes.

62543. In what grades of education was the bulk of this increase?—The figures I have quoted refer to all expenditure on education and include heavy expenditure on the University. I am afraid I cannot give you the corresponding figures for vernacular education offhand; I could get them.

62544. But there has been a considerable increase in expenditure?—A very great increase, owing to the introduction, two years ago, of a very liberal salary scale.

62545. What is your salary scale now in the primary schools?—I have got it here—

Teachers with high school certificate get Rs. 70—4—90.

Teachers with a middle school certificate get Rs. 50—4—70.

There are two elementary certificates—

Elementary A with ten years' completed service gets Rs. 40—2—50.

Elementary A with less than ten years' service gets Rs. 30—2—40.

Elementary B, an inferior certificate, gets Rs. 25—1—30.

All uncertificated teachers get Rs. 25.

English teachers in vernacular schools get Rs. 60—4—80.

To enable local educational authorities to pay those salaries, Government have had to increase its contributions to them very largely.

62546. I suppose this increase of salaries will lead to an improvement in the class of teacher?—It is undoubtedly doing so already.

62547. And that will ultimately, I presume and hope, lead to an improvement in the standard of education?—Yes.

62548. In India we were told frequently with reference to the question of women teachers, who, after all, of course for small children are the best agency, that there are difficulties in sending them out to lonely villages and placing them away from their own homes. Does that difficulty arise to any extent with regard to Burmese women teachers?—Constantly. We obviate it to some extent by our system of elementary training classes training people for the elementary certificates I have just mentioned; it is not a highly efficient method of training but it has the advantage that we can, at any time, put down one of these classes for a year or two in any locality; so we train the teachers near their own schools and they go back to the schools that they came from.

62549. That probably has an indirect advantage too, has it not, that the person has local knowledge?—I think so. There are many advantages in the system. The disadvantage, of course, is that when you want experts on such subjects as physical training, social hygiene, or school gardening, it is difficult to supply them: you can only attach one teacher to each of these small institutions. The advantage is that they are elastic and easy to move.

62550. I suppose, that from the point of view of elementary education, your educationalists would prefer to be left alone to develop a literary type of education rather than be befogged with all sorts of new suggestions?—That is not true at all.

62551. You do not mind them?—Not at all, we welcome them, because we have got to do something to make our schools hold the pupils and suggestions of that kind may be helpful.

62552. *Professor Gangulee:* Your primary schools are one-teacher schools?—A great many of them are, I am afraid, but by no means all; it is impossible to say offhand, but I should say the majority certainly are not one-teacher schools; the majority probably have two or three teachers.

62553. What would be the average number of students in a primary school?—I am afraid I cannot answer that question either offhand; at a guess I should say twenty; it might be more. I am certain of this, that in the last three years the figure has risen considerably. I have not been touring vernacular schools for some years and probably my figure of twenty may be out of date. I have noticed in recent reports that the average size of schools is rising.

62554. With the increase of salaries of teachers, do you also raise the standard of teaching-training?—I am afraid we have not yet; we hope to.

62555. In stating the reasons for the premature removal of school children, you said the chief reason is bad schools?—Yes.

62556. How many School Inspectors have you at present?—Nine; seven are Inspectors in charge of an area generally coinciding with a Commissioner's Division.

62557. So that I think you are under-staffed there?—Yes, I think we are.

62558. You cannot expect one Inspector to be able to inspect all the schools in a big Division?—These Inspectors have many subordinates, Assistant Inspectors, Deputy Inspectors and Sub-Inspectors. Roughly, I should say we have a Deputy Inspector in charge of every fifty schools; that is what we aim at and we get somewhere near that.

62559. What are the qualifications of these inspecting officers?—We have the four grades of inspecting officers which I have just mentioned. The last grade is moribund. To which of the other three are you referring?

62560. I am referring to the first grade, the Inspectors?—The Inspector is supposed to be the most highly qualified man we can recruit. The Inspectors were all, until the Lee Commission recommendations, supposed to be members of the Indian Educational Service. There has been, as you no doubt know, a gap between the Lee Commission recommendations and the provision of any scheme to take the place of the Indian Educational Service. Recruitment has stopped and some of our Inspectors now are subordinates officiating who would never have been promoted to the Indian Educational Service; so the standard of inspecting has certainly suffered through that period of waiting for a new Superior Provincial Service.

62561. Your definite opinion is that the standard of efficiency in inspecting has suffered?—The standard of efficiency among Inspectors has, but in the lower ranks it has improved considerably. As regards the Inspectors only, the standard has gone down.

62562. The Subordinate Inspectors are all Burmans?—Practically all, not quite all.

62563. Have you a text-book committee?—Yes.

62564. Speaking of premature removal of children, you say the Government is to some extent responsible for the material view of education which leads to premature removal of all children who are not expected to become teachers or clerks. What is actually in your mind?—I understand that our Government are no more to blame in that respect than any other Indian Government. You are probably acquainted with the regulations called Clerkship Rules? That is what I am referring to. I think they exist in every Province. I have our Clerkship Rules here; for instance: "No person shall be appointed to be an apprenticed clerk until he produces a certificate of having passed the seventh standard examination, vernacular or Anglo-vernacular." "No person, not being a Government servant, shall be appointed direct to a clerkship on a pay of Rs. 100 or over until he has passed the high school examination." And he cannot be promoted in his office beyond a certain grade until he has passed the high school examination; and so it goes on. In the Secretariat here, we have a higher grade of clerks, with special pay for graduates, and non-graduates. That is what I am referring to.

62565. When you speak of the material view of education, you are referring to these rules?—Yes, I think the insistence on these rules has encouraged people to take a material view of education. We have encouraged them, as it were, to set up false gods, the worship of which has not encouraged respect for learning; that is what I feel.

62566. How do you connect this material view of education, for which you make the Government responsible, with the premature removal of children from school?—The connection is this: they do not go to school for learning; they go to school in the hope of passing the seventh standard and the tenth standard later and so qualifying for posts. If they have no particular influence to help them to get posts, or if they are not particularly bright children, they leave very soon, instead of going on long enough to get some good out of their schooling.

62567. Are you familiar with the Moga system of education?—I have read a good deal about it and I spoke for some time with Mr. McKee when he came here.

62568. How many teachers in your primary schools are familiar with the "project" method used at Moga?—The name 'project method' is pretty well-known, because Mr. McKee conducted a well-attended conference on it, and people have moved about since and talked about the project method; but whether the ordinary primary teacher connects it with the Moga system is very doubtful. Many of them have very vague ideas about the project method; so have a good many people besides our teachers.

62569. You are not trying to introduce this method?—I consider the encouragement of the project method part of the general introduction of modern methods of teaching; we are doing our best and hope to do better.

62570. On this question of compulsory education, how do you propose to finance your scheme for compulsory education?—From what I know about our provincial funds, I do not think it would be possible to finance it without further taxation, and I think that taxation should take the form of a special education rate, so that people should know what they are paying for.

62571. An education-cess?—Yes.

62572. Like that proposed in Bengal?—I think so.

62573. What is the attitude of the district councils towards such a measure?—The district councils are so straitened for funds to carry on their existing institutions that I do not suppose that they have given much thought to it.

62574. Do I understand that the transfer of the control of vernacular education to the local bodies has not proved satisfactory?—To my mind it has proved a success, on the whole, from every point of view except the financial. At the time of the change, the financial adjustment necessary had not been sufficiently thought out and it has not yet been perfected. Recently a "Permanent Settlement" of Provincial contributions to district councils has been arrived at and that permanent settlement is intended to place the district councils in as good a financial position as regards their resources and liabilities as they were in 1923, before the Act came in. That means that district councils which have not got surplus funds (that is, the majority of district councils) are given special Provincial contributions in order to enable them to pay the teachers which they had in 1923 at the superior rate which has recently been introduced. So that the contributions have been large but not large enough to enable most of these unfortunate local educational authorities to embark on any new schemes or open any new schools. That has discouraged them considerably. It was a pity that that happened in the early days of their taking on this responsibility. In other ways, apart from the financial side, the transfer has on the whole been a success, mainly because it has increased local interest in education in a remarkable way.

62575. It is gratifying to see that you attach a great deal of importance to adult education; and the Baroda Library Scheme in your judgment seems suitable for adoption in Burma. The initiative in the case of the Baroda Library Scheme came from the Government. Do you propose that such a movement should be initiated by the Government of Burma?—I am shy of any schemes for adult education initiated by Government in this country in the present state of public opinion, but I think a library scheme can safely be initiated. The reason why I object to Government initiating schemes for adult education is that it is liable to be suspected of propaganda. Suspicious people are, however, not likely to have the same objection to our merely providing local libraries with books and for that reason I have come to the conclusion that Provincial authorities ought to take the first move in a library scheme. I think it is a matter of such national importance at present that it ought not to be left to the local authorities as they are now.

62576. Speaking about voluntary agencies to undertake adult education, you say there is a lack of such agencies in Burma. Are you familiar with University students?—I know a good many of them.

62577. Do you see any indication of their taking up adult education as is done in the West?—I see several indications but that would not help the villagers. We have, for instance, a high school in Rangoon which runs its own night school. That happens in many parts of India. University students would do the same in the towns but they cannot get at the villages. In Madras, they have student societies for making inquiries

into village conditions; that is excellent but I think it is going to help the students more than the villagers.

62578. The Madras scheme has been initiated by the Christian missions and, as far as I can make out, they are successful. If the Christian missionaries could undertake that work in Madras, why do you say that you doubt if they would prove acceptable to the Burma villagers?—Rural Burma took to politics quite recently and suddenly and, in my opinion, political agitation has made the Burmese villager less friendly to foreigners and non-Buddhists than used to be the case. There is an unfortunate connection between politics and religion and, therefore, a missionary who is not a Buddhist is not likely to be welcomed as a helper in the villages in the present state of feeling. That is my personal opinion.

62579. Burma is not so politically conscious as Madras for instance, but Madras people welcome missionary enterprise?—That is probably because Madras people have been taking an interest in politics for many years. Burma has only recently started.

62580. Referring to adult education, you say that your conclusion is that that work must probably wait for the establishment of a national form of Government or until district councils have sufficient enlightenment and funds to undertake it. What do you exactly mean by the establishment of a national form of Government?—I mean a form of Government which gives less impression of alien domination. It is my experience that if people suspect their Government (as they are likely to do if they have an alien form of Government), it is a dangerous thing for the Government itself to attempt adult education. Suspicions of political propaganda have been an important factor in the history of adult education. Take the work of the Educational Association in England. It has had a very fine record but it has not had the support it ought to have received because it was unjustly suspected of political propaganda. It is largely my study of adult education in England and other countries that has prevented me from recommending Government to move first in regard to adult education classes in this country.

62581. *Mr. Kamat:* It has been claimed that in the Punjab the movement for adult schools has made some progress. Have you heard about it?—I have read and heard a great deal about it.

62582. There the initiative is taken chiefly by Government; is that the case?—I believe so.

62583. According to your principle, in England and in other places wherever the Government initiative comes in there is suspicion. How do you account for the success in the Punjab? There, under Government initiative, some progress has been made?—I do not know the Punjab well enough to reply. There are exceptions to every rule and I suspect the explanation is that you have had there an exceptionally enthusiastic set of educational officers who have somehow managed to get the confidence of the people and public opinion. Officials have not been so fortunate in winning the confidence of the people here.

62584. It has been officially stated that the monastic schools are a great difficulty in the way of introducing compulsory education. Would you explain in what respect they are a stumbling block to this measure?—There are two ways of bringing them in. One is to find out that any one who attends these monastic schools, satisfies the requirements of the Act. The difficulty then would be that most monastic schools are not registered and object to supervision and so you do not know whether your children are getting education worth having or not. As regards the quality of the secular education, all that you would know is that it is probably much worse than the education in the recognised schools. The other alternative is to make provision in the list of exceptions which exists in every Compulsory Education Act I have seen (*e.g.*, that pupils need not go to schools if they live a mile away from a recognised school). You may include an exception covering all children attending any monastic school. The difficulty will then be that you have no control or supervision over these schools and if anybody wishes to evade the Act he has simply got to say, 'My son goes to so and so's school'. That is why monastic schools constitute a serious difficulty in connection with compulsory education.

62585. But you have recognised a certain percentage of monastic schools?—Yes; such schools present no difficulty, they are recognised schools but, as stated in Mr. Snow's general summary* of the situation, they are comparatively a small and decreasing number.

62586. Has any definite attempt been made to induce a few enlightened people in charge of these monastic schools to fall in with your recommendations, for instance, to introduce arithmetic, so that they could satisfy your standard of a recognised school?—We have been working hard at that ever since I came to this Province twenty-one years ago. We have had, during my term of service, men on special duty going round to these monastic schools and their efforts have met with considerable success.

62587. Supposing then you start compulsory primary education, either you have to ignore the whole of this foundation of village schools which exists in this Province or you have to start on entirely new foundations. Which of these two things would you prefer?—I do not see the alternative. We need neither ignore the existing schools altogether nor start on entirely new foundations. I want to make our Act of such a kind that it embraces both types of schools and I have suggested what seem the only two ways of doing it. If we have a Compulsory Education Act, we shall certainly have to include these monastic schools and we shall have to accept some form of certificate from some local authorities that the children are attending monastic schools.

62588. You are prepared to recognise a certain proportion for the purpose of the Act?—Then you would have a puzzling confusion in your Act between fully recognised schools and schools recognised only for the purpose of this Act. It would make it extremely difficult to draft.

62589. Out of these monastic schools are there any receiving aid from Government?—A considerable number. It is stated in the printed handbook* on page 163, that they have decreased, since 1921-22, from 1,890 with 80,900 pupils to 1,184 with 69,600 pupils. These figures are for recognised and inspected monastic schools.

62590. It has been suggested that there is no discipline in these monastic schools. Does that mean discipline according to the standard laid down by your department or is there no system of discipline according to the Buddhistic or Burmese standard?—I cannot say what it means because I have never made that statement, nor do I know who has made it.

62591. You will find the reference on page 164* where it is stated that discipline is non-existent and the average attendance is only twelve per school. I want to know what is meant by that expression 'discipline is non-existent'?—I should say it is a rhetorical exaggeration. The discipline is very different from the kind of discipline which people expect in an ordinary school. Sometimes I think the discipline is very severe indeed. It is rather spasmodic than continuous.

62592. My own idea is that the Buddhistic religion lays down a certain amount of discipline?—I too would not accept the literal statement that discipline is non-existent in monastic schools.

62593. It has been stated in the official papers submitted to us that the Punjab system of having agricultural training in the middle schools is impossible in Burma. I want some further explanation from you regarding this view?—It is impossible at present, simply because we have so few middle schools, large enough for farms to be attached to them. That really is the practical difficulty. You will find the figures for that in Mr. Snow's statement. I think the average number in the middle department of a middle school is eight and you surely cannot provide a farm for eight children. The larger middle schools are in towns and not in the villages, so that it would be difficult to provide them with farms. That is our practical difficulty.

62594. *Sir Thomas Middleton:* Has your attention been drawn to the short courses for adolescents which the Agricultural Department is experimenting with in this Province?—No.

62595. You have not seen these experiments?—No, I have not been consulted about them and I have not seen any description of them. I have only been officiating in this post for six weeks. Before that time I would not be likely to hear about any scheme of that kind.

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*A Collection of Papers written by Government Officials for the Commission—Not reprinted.

62596. In answer to Question 2 (*c*), you say that school-farms are a device for combining general and vocational education and that such devices are seldom successful?—Yes.

62597. You obviously distrust any attempt to combine vocational education wtih general education?—I think I do but not from experience, because I have seen few experiments of the kind. I distrust it simply from my reading of authorities on the subject. I will admit that the objections to technical education in the ordinary school are generally from people who are considering workshop or industrial instruction rather than farm work, and there is a stronger case against it there because manipulative skill in commercialised technical education becomes so mechanical that it does not require much intelligence and very often definitely discourages thinking. I think that is one of the reasons for the pretty general fear of introducing commercialised vocational education into schools as they have done in the Philippines. But I will admit that the objection is not so strong in connection with agriculture. I myself have an open mind on it.

62598. Take the converse proposition: What is your view of giving some general education in such vocational schools as may be found in this Province?—I think that is essential. I have attended conferences, in England, of people interested in adolescent education, and I have read carefully the Report on 'The Education of the Adolescent' by the Consultative Committee of the Board of Education. The need for including general education in vocational schools is now generally admitted. It is very wrong to take any one in his 'teens and give him technical education without continuing his general education.

62599. In Burma, there would seem to be a special reason for giving some general education inasmuch as your three R's in the monastic schools omit arithmetic?—That is true.

62600. So that if a young Burmese cultivator went to a farm school he would have to learn arithmetic?—Yes, that is so.

62601. I am interested in your recommendation for country libraries. It seems to me, at any rate, that the conditions in Burma are just the conditions in which these libraries are likely to be most useful. You have a relatively widespread but very weak form of literacy?—I quite agree; the chief difficulty is the paucity of books. I understand that has been overcome to some extent in the Punjab by departmental co-operation in producing pamphlets. A few months ago we carefully collected books suitable for school libraries, in Burmese. I have a printed list here, it contains only 85 books and in order to prepare this list we had an expert working hand; and then we found that about a third of them were out of print. We certainly need more books very badly.

62602. In the case of the Baroda Library to which you refer, there is a very much longer list of vernacular books available than the list you have?—I fear that is so.

62603. The object of my question was to ascertain whether the cost of libraries was holding you back in Burma?—I do not think that it is the cost; the fact of the matter is that nobody has so far formulated a scheme. We have not got a central library and that is a serious difficulty.

62604. It is quite essential for the working of such a scheme that you should have a central library?—Yes; we have got The Bernard Free Library, but there is no room in its building for a country department.

62605. The Baroda Library has been specially equipped for "circulating" work and the scheme works with great smoothness?—So I understand and I hope that we may be able to send some one there to take their librarian's course with a view to organising a similar scheme here. They offer to train librarians from other parts of India.

62606. There is just one point arising out of your answer to Question 23 (*a*): "Government is to some extent responsible for the material view of education." Is that not purely accidental? Is it not the fact that Government is a large employer, and that any large employer of labour must be responsible to some extent for material considerations in the view and outlook of persons undergoing training?—The passage refers to the use made of school examinations in the Clerkship Rules which I mentioned a little while ago.

62607. Is it not, in a sense, accidental?—I know of no other large employer of labour who takes two school examinations and makes a man's salary for life depend on which he passed, often before he was eighteen.

62608. You definitely object to such rules?—Yes. Commercial firms have their own examinations or recognise the examinations of some polytechnic or commercial institute. They fix a man's salary according to his ability, after trying him. That is just what we cannot do in the Government offices. If the man does not pass the requisite school examinations we cannot promote him. So the public thinks altogether too much of school examinations.

62609. *Mr. Calvert:* You have, I think, read the evidence* given before us by Sir George Anderson?—I have read it but rather hurriedly.

62610. Do you agree generally with the policy he enunciates?—I cannot remember it well enough; I would rather not say that I do.

62611. There is some criticism of the Punjab scheme in the notes submitted by Mr. Snow which seems to me to be based upon a misunderstanding of the scheme?—Mr. Snow took the view that the Punjab scheme was an attempt to combine definite vocational education with general education. I understand that is not so but I think that some printed publications of the Punjab Government encouraged that view. For instance, I have got here Sir George Anderson's 'Report on the progress of education in the Punjab for 1925-26.' On page 48 there is this passage, "Vocational training—Agriculture. In the matter of vocational training there is not much to add to the remarks which were made in last year's report. The popularity of the farm and gardens attached to schools for practical work tend to strengthen the contention that vocational training should be imparted alongside the general training and should not be given in separate schools." Then on page 171 of the same report under "Vocational training treated in more detail": "The experience gained during these years has brought home the truth of the principle that to be successful vocational training should be associated with, and not divorced from, general education." If Mr. Snow misunderstood the intention of the Punjab scheme I think he had some excuse in view of the two quotations which I have just given you. I have looked up these quotations and read them in order to explain Mr. Snow's view, which I think is understandable.

62612. *Sir Thomas Middleton:* I think that in the report you have quoted 'Vocational' means pre-vocational?—I think so; if the word 'pre-vocational' had been used in connection with the farm schools, Mr. Snow would have written differently about it.

62613. *Mr. Calvert:* The object should be to use agriculture as a means of mental discipline and training?—I am of that opinion, and Mr. Snow would be too. I think it is mainly confusion of terms which has caused a misunderstanding.

62614. Then Mr. Snow refers to a few exceptionally expensive show schools. I think Sir George Anderson in his evidence,* which you have read, said that the cost per pupil was almost *nil*?—Mr. Snow had not had the advantage of reading that evidence when he wrote that note. For a long time the Punjab experiment was confined to four or five schools which were far from paying their way. The part of Mr. Snow's note which you quote is re-printed from an old one, written quite early in the history of the Punjab scheme.

62615. Am I correct in gathering that you regard compulsion as chiefly valuable to stop wastage rather than to bring the last boy in the last village to school?—I entirely agree with you there and with all that part of Sir George Anderson's evidence.* I agree with him as to the danger of school attendance officers.

62616. Apart from compulsion, it is difficult to conceive of any alternative method of stopping this extraordinary wastage?—Yes.

62617. Do you have, in Burma, women teachers for boys?—Yes.

62618. Are they paid less than men teachers?—No; they are paid on the same scale as the men.

62619. So that the fact that female teachers are available is not giving any financial relief?—No; it is not.

62620. Is there any special reason why women are paid the same rates as men in Burma, whereas in most countries they are paid lower rates?—

* *See* Volume VIII (Punjab Evidence).

I cannot think of a reason, except that Burmese ladies figure very largely in commerce and social life and get their own way in a great many things.

62621. *Mr. Reynolds:* In your answer to a part of Question 2, you mention that parents and children object to the manual labour entailed in nature study and school-gardening. In answer to another part of Question 2, you speak of the children of agriculturists being attracted to school not to pursue agriculture but to escape from it?—In the passage to which you refer I said that might happen; I did not say that it does happen.

62622. Is it your experience, as it has been my experience, that there is a very sharp distinction between an illiterate person who will condescend to work with his hands and a person who has a smattering of education and will refuse to touch a spade?—I cannot say that I have noticed it much myself; I have not come across the second class in Burmese villages. Many of our vernacular school-masters, when they knew that the Deputy Inspectors and Inspectors wanted them to take to gardening, did so, they sweated at it and made the children sweat at it too. I have very seldom heard those men objecting to school-gardening on that ground.

62623. You have not come across cases as I have, where fifty or sixty men who had studied up to the seventh standard refused to carry a spade a hundred yards through a street in the town to work in a football field, because they were afraid they would be laughed at?—No, but I can imagine that happening.

62624. Do you think any attempt to introduce vernacular teaching beyond the second standard would be likely to be coupled with a reluctance to carry on their agricultural pursuits? Do you think that that would be one of the first difficulties to be encountered?—If you taught much English, yes; if you did not teach English, I do not think the difficulty would be serious.

(The witness withdrew.)

Major G. G. JOLLY, C.I.E., M.B., Ch.B., D.P.H., D.T.M. & H., I.M.S., Officiating Director of Public Health, Burma.

Replies to the Questionnaire.

QUESTION 22.—CO-OPERATION.—(*b*) (*iv*) I accept the need for establishing such societies, but would urge that a necessary preliminary is the formation of a district health service under the district councils without which such societies are likely to be ineffective so far as the improvement of health conditions is concerned.

QUESTION 25.—WELFARE OF RURAL POPULATION.—(*a*) Suggestions for improving hygiene in rural areas and for the promotion of the general well-being and prosperity of the rural population.

The villager in Burma passes his life in conditions admirably adapted to the spread of communicable disease. His water-supply is freely open to pollution; his primitive methods of disposing of excreta and rubbish favour the multiplication of flies and the development of worm diseases, while his close association with a large rat population, which live with him and at his expense favoured by the Buddhist prejudice against taking life, exposes him to the danger of plague. His simple mat and thatch houses afford ideal shelter for the malaria mosquito.

The fact that he remains as healthy as he does depends among other things upon the circumstance that his villages are in the main comparatively isolated and that his diet is on the whole adequate and well balanced so that he is fairly well nourished and therefore able to put up a fight against infection. Nevertheless his infantile mortality is terribly high and his expectation of life, though higher than that of other Indian Provinces, pitifully low compared with European standards.

In such an insanitary environment he is unable to improve his health or to guard against epidemic disease. His village, if isolated, may remain free of infection for years, but when once infection is introduced there is no line of defence. When it is remembered that we are steadily breaking down the isolation of his villages and by means of roads and railways and steamship traffic promoting the spread of disease, it will be realised that his health, such as it is, must deteriorate unless we adopt means to provide him with a line of defence against the inroads of the ever increasing flow of infection.

Such a line of defence has been elaborated in other more advanced countries and has stood the test of time. It consists of three main components—(1) a Health Service of men and material devoted exclusively to the prevention of disease; (2) measures directed primarily towards the improvement of environmental conditions, for example, water-supply, housing, drainage, conservancy; and (3) measures directed primarily towards improving the health of the individual, including the medical inspection of school children, sickness insurance, infant welfare work, and the preventive treatment schemes against specific diseases such as tuberculosis and venereal disease. I give these measures in their order of logical sequence and it is important to remember that they should be developed in that order. Thus, it is useless to expect much improvement in environmental hygiene until we have an adequate basic health service; or to look for much improvement in the health of school children by inspection and treatment until we have improved the environment in which they live; or to launch out upon a scheme of tuberculosis dispensaries and sanatoria until we have dealt satisfactorily with the housing question in overcrowded towns.

A District Health Service.—It is as well to realise at once that we have no District Health Service in Burma in the sense in which the term is understood in other countries. We have the very part-time services of one medical officer per 300,000 persons and 26 Sanitary Inspectors among a rural population of nearly twelve millions.

In each district having an average population of over 300,000 the Civil Surgeon is *ex-officio* Health Officer. When it is realised that this officer has a large public hospital to attend to, frequently is in executive charge of a jail, may be Railway or Port Medical Officer in addition, is usually a certifying surgeon and frequently a school medical officer, and over and above all this is permitted to engage in private practice, it will be obvious that if all these duties are to be properly carried out the time he will have left to devote to the public health service of 300,000 persons is negligible. The appointment is a nominal one, and the fact that we have nominally a District Health Officer has in my opinion masked the urgent need and delayed considerably the appointment of full time properly qualified men. The two quotations below corroborate my statements:—

*"In most districts in India the Civil Surgeon is also in theory the Sanitary Officer of the district. His duties at headquarters, however, do not allow him to tour and inspect in the district to the extent that is necessary; even in the case of epidemics in the district it is sometimes not possible for him to leave headquarters. In some Provinces District Sanitary Officers have been appointed and there can be little doubt that many more such appointments are required and that one of the most urgent and hopeful measures for promoting rural sanitation is the appointment of well qualified and whole-time District Health Officers to control and organise all sanitary arrangements and experiments in the district."

†"In theory the Civil Surgeon of the district is in charge of the sanitation of the district; this usually over-worked official has neither the time nor usually the very special training that is essential to success in the prevention of communicable disease."

The question of private practice in relation to public health work cannot be better expressed than in the words of Sir George Newman, who, writing of part-time health officers, states: ‡"However competent he may personally be, he frequently suffers from certain, and perhaps unavoidable, disabilities. He is individualistic rather than communal in outlook;

*Government of India's 'statement of policy' issued in 1914.

†Note on rural sanitation in India by Major F. Norman White, 1918.

‡Extract from the report of the Chief Medical Officer of the Ministry of Health, Great Britain, for 1924.

he finds it difficult equally to keep pace with his clinical work and his administrative duties; his interest as a private practitioner may conflict with his public duty; the proper exercise of his public duty may bring him into collision with his fellow practitioners; in periods of epidemic he cannot find time to fulfil his dual function to his patient and to the community; as a private practitioner he has often not had the special training in public health necessary to efficiency as a Medical Officer of Health."

The need then is for full-time Health Officers who should preferably be Burmans, because for many years to come their work will be in the main education, to arouse "the sanitary idea" in the minds of the people. In the first instance we require a full-time qualified Health Officer per district. Later on we shall want more and eventually a full-time Health Officer per circle (average population 30,000). In addition to this, we need, to work under the District Health Officer, at least one qualified Sanitary Inspector per circle, or a total of 287 Inspectors for the 28 districts which have district councils, not to mention those which are still under a Deputy Commissioner.

A scheme for the provision of this staff is under consideration by Government and I hope that by 1928-29 we shall have sanction to begin the appointment of full-time District Health Officers. We cannot advance very quickly because of the lack of suitable men, but the great thing is to make a beginning. The scheme suggested is a half-pay grant system; the Provincial Government contributing half the pay of the officers and the district council finding the other half and the allowances. The Ministry of Health in return for Government's contribution should retain the right to prescribe qualifications and duties, and to have a veto over appointments and dismissals, thus affording security of tenure.

So far the Local Government has not agreed to meet half the pay of Sanitary Inspectors. I consider this to be an essential measure if we are to get security of tenure and honest work from them.

It is also necessary that the Local Government should take powers to compel the appointment of both classes of officers by district councils. So far these powers do not exist.

The development of our rural and also of our urban health service will necessitate a strengthening of our central Public Health Department, and I append to this note a diagram * showing the general lines upon which I consider such a development should take place. The central department is now much understaffed, and is unable to develop its activities beyond the present point.

Measures directed primarily towards the improvement of environmental conditions.—In the absence of a District Health Service, we are not in a position to do very much in the immediate future towards improving the environment of the villager. Even the problems involved are not by any means fully appreciated though we have a general idea of them. The villager himself, accustomed from birth to the conditions in which he lives and dies, looks upon them as normal and more or less inevitable. The spread of health knowledge and actual demonstration of methods are required to arouse him to the possibilities of improvement. In the vast majority of cases he is not only ignorant of, but profoundly sceptical towards, the germ theory of disease which latter he ascribes to the influence of evil "nats". At the same time, many have noticed that epidemic disease follows improved communications and that there is a measure of safety in isolation. Malaria they frequently associate with water, though they do not appreciate the role of the mosquito.

It is impossible in this note to go into detail regarding the improvement of health conditions in villages and I can only indicate briefly some of the more important lines on which an advance is called for.

Water-supply.—In riverain tracts rain water is the main source. It is always freely open to pollution and always dangerous. Cholera in particular haunts these areas though it is only at certain seasons that it becomes epidemic. The problem in these tracts is to supply the villagers with an alternative source of drinking water which is comparatively safe and at least equally attractive. In most cases this can be done at relatively small cost by providing properly constructed shallow wells. Education and

* *Vide* Appendix.

some measure of authority is required to induce the people to use certain wells for drinking only and to abandon the use of raw river water for that purpose.

In areas away from rivers the source of supply is usually wells or tanks. Both require to be properly protected against contamination and correctly used. In dry areas, the question of quantity as well as quality comes in and deep tube wells and aqueducts may be required. The tube well section of the new Engineering Branch of the Public Health Department will require to be much strengthened in staff and equipment to cope with water-supply questions in the dry zone, and ample budget provision provided from provincial funds to carry out the necessary trial borings, the cost of which should not fall upon district councils. In irrigated areas, the temptation to drink the raw water from the irrigation canals is great, and might be combated by the provision of filter wells communicating with these canals.

For the improvement of village water-supplies generally we require a considerable development of the Engineering Section of the Public Health Department.

Conservancy.—I use this term in its widest sense to include the collection and disposal of waste products. Excreta and especially fæces present the greatest problem. In the dry zone, I advocate the use of deep pit latrines which are simple and cheap. Here education and demonstration and simple regulations can deal with the problem which is the key to the hookworm question.

In the flooded areas of the Delta the problem is much more difficult. A deep pit latrine is impracticable, and I believe we must concentrate upon the provision of a simple type of septic tank latrine, the design of which requires much research and trial. This is one of our most pressing needs and would justify the appointment of an officer on special duty.

Rubbish disposal is theoretically a simple matter—by burning or spreading on the fields outside the village. The important point is to obtain the rapid removal of garbage from the neighbourhood of houses. This is a matter for Circle Boards and Village Committees to tackle.

Housing.—The materials must depend upon what is available locally and the Burman has evolved a type of habitation very different from that in general use in India. It has been suggested that his mat and thatch house raised on piles has afforded him a measure of protection against *kala-azar* and this is a possibility. At the same time, it lays him open to malaria, for a mat and thatch house offers ideal cover to mosquitoes. Recent investigation by the Special Malaria Officer shows that timber buildings are freer from mosquitoes than mat and thatch. Again, the type of Burman hut usually met with offers good facilities to rats and a few minor alterations in design would make a big difference. For a proper test of their value and to induce their trial on a sufficiently large scale a District Health Service of Burman officers is required. Within the houses themselves a more general use of mosquito nets is highly desirable and an effort might be made to weave locally a cheap mosquito netting out of Burmese cotton.

Village layout.—The majority of villages are badly planned from the point of view of health. The simple instructions for headmen in the Village Manual are frequently neglected and many villages present the appearance of having grown anyhow. The question of village layout is one which should be taken up energetically by Circle Boards. This unfortunately also depends on our District Health Service, for much educative work will be required to impart the necessary knowledge. It is impossible to keep sanitary a badly planned or unplanned village choked with undergrowth.

Malaria.—In many areas this problem is at present impossible of solution except by the universal use of quinine. At the same time, Malaria infection is not infrequently highly localised and, with intelligent co-operation on the part of the villager, much can be done. Sometimes the village is sited in the wrong place, and a move a few hundred yards away would make all the difference. This is particularly the case near the foot hills. What is required is detailed malaria surveys of village tracts to determine

the exact conditions, which vary enormously from place to place. Only after such surveys can correct advice be given. A start has been made by giving our existing public health staff training in malaria survey work and I look upon it as an essential that all future District Health Officers should be thoroughly acquainted with this work.

The above are only a few of the points that occur to one when considering the subject of rural sanitation. They indicate the immensity of the problems involved and how unprepared we are at present to tackle them. Questions of habit and custom are involved, such as the wearing of shoes when visiting the latrine and the methods of storing rice so as to keep it dry and inaccessible to rats.

Measures directed primarily towards improving the health of the individual.—I have stated that these measures should come third in our scheme. They have of recent years been taken up vigorously in advanced countries like England, America and New Zealand. Even there they have by some experts been termed "the wrong turning in public health", the idea being that we have effected such vast improvements in the public health by environmental hygiene that there is a risk in diverting attention from the environment to the individual. I do not altogether agree with this extreme view, but I do hold that it is a mistake to concentrate upon what I would call "individual hygiene" until we have established a basic Health Service and made considerable progress in environmental hygiene. Exceptions to this generalisation undoubtedly exist, as, for instance, vaccination for smallpox, but here the case is clear for we know that by this single simple measure universally enforced we can effectively control one of the greatest scourges of humanity.

In Burma we have already introduced a rudimentary system of medical inspection of school children in Anglo-vernacular schools. This only touches the fringe of the problem, for the vast mass of vernacular school children who most require attention remain untouched. Already, however, we have done enough to realise the limitations of the system in a country where the Health Service is so undeveloped and environment so favourable to disease. We can detect the physical defects of school children, but are not yet in a position to correct the conditions which produce them nor even to ensure appropriate treatment.

The scheme having been started must go on, but I look upon it at present as mainly of value in opening our eyes to the defects which exist. For their correction we must await the creation of an adequate Health Service and the improvement of environment. The main need at present in connection with our school medical inspection is the appointment of an Assistant Director of Public Health (Schools) to work in close co-operation with the Education Department, to supervise the activities of the school medical inspectors, to deal with their reports and to undertake the training of medical practitioners and school teachers in school hygiene.

Child welfare work has been taken up with more or less enthusiasm in various centres in Burma but so far only in towns. Here the tendency is to develop this work, mainly done by voluntary agencies, before other conditions are favourable. The task is rather an impossible one and results affecting appreciably the infantile mortality are hardly to be expected at this stage. I would not discourage the workers, however, for I look upon their efforts as valuable from the point of educational propaganda.

A tendency exists to organise special measures directed against specific diseases, e.g., leprosy and venereal diseases. It seems necessary to sound a warning here. Inasmuch as these diseases may be dealt with by the existing medical staff and hospitals the effort is permissible, but to spend money in opening out special leprosy or venereal disease dispensaries before we have a basic health staff or sufficient general medical aid is to embark upon a wasteful policy, the result of which can only be disastrous. What we need urgently is more medical men both for the Public Health and Medical Departments and we should concentrate upon that and avoid wasting our money on bricks and mortar, or multiplying treatment centres for special diseases. We should concentrate upon the provision of an adequate Health Service, the provision of sufficient medical practitioners who should be our

front line, and the improvement of environmental hygiene, and we shall then be in a position to branch off on side lines to deal with special diseases by special methods.

Research and investigation stand by themselves and must be encouraged. There is every reason why we should prosecute energetically research and investigation, more especially into the communicable diseases of Burma, even though we may not yet be in a position to apply the results on a large scale. Our preventive methods are derived from the results of such work and therefore research should always be ahead of administrative action.

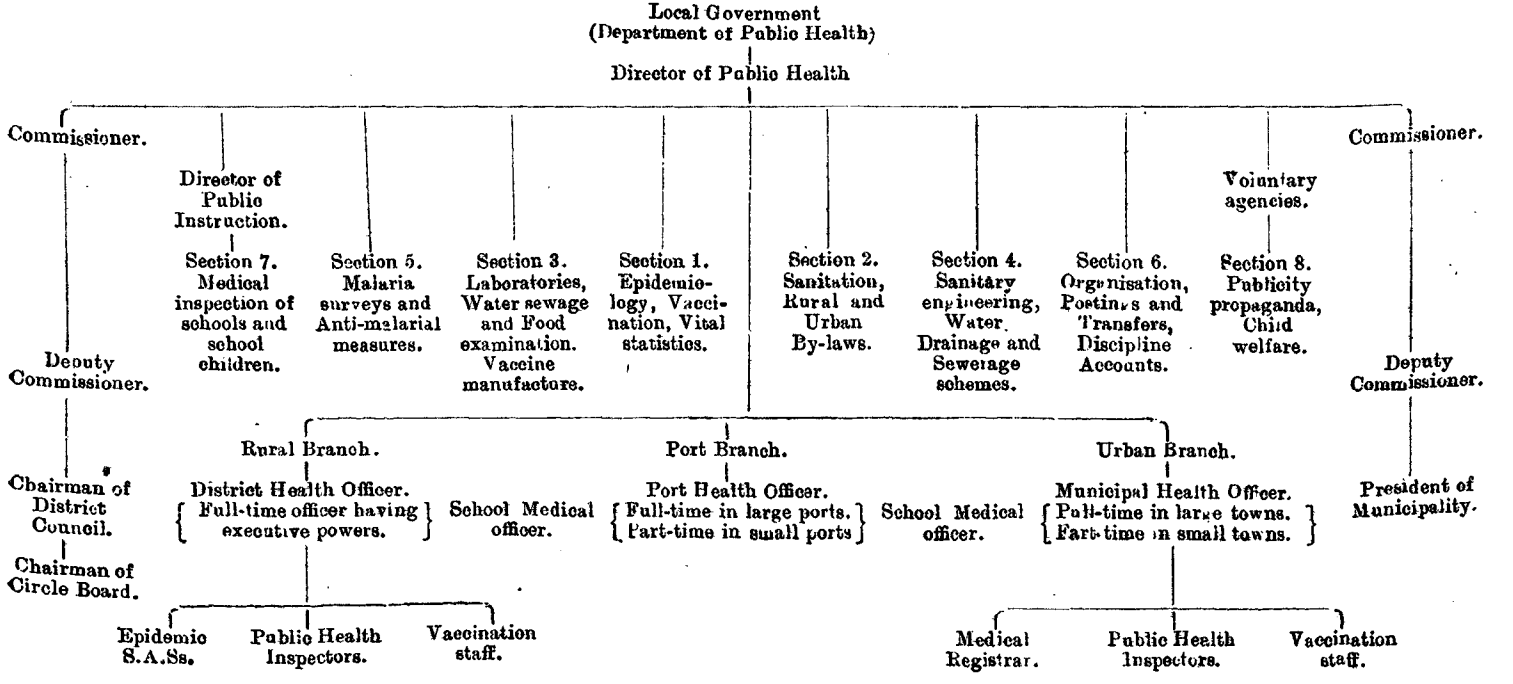
Two other points require mention: the need for developing the Public Health Engineering Department and the question of the pay of the Health Department.

The Public Health Engineering Department.—The Local Government has recently decided to form an Engineering Branch of the Public Health Department thus separating the existing Water and Sewerage Engineer from the Public Works Department. This is a step in the right direction and it is to be hoped that this Branch will now develop quickly and become better equipped to deal with its rapidly expanding work. The central staff of the Water and Sewerage Engineer requires strengthening. We also need to supervise the qualifications of and give special training in Public Health Engineering to the District Council Engineers who are already beginning to be appointed in the districts of Burma.

The pay of the Public Health Department.—Looked at from the point of view of pay, the Public Health Department is a minor Government department. From no other view point can it be classed as such. It is an anomaly, for example, that its head should be paid less than the head of the Prisons or Medical Departments. The same tendency to undervalue and underpay Health Officers occurs with a few exceptions throughout the Health Service. A Health Officer ought to be a man of exceptional training and qualification. He is forbidden private practice and it is necessary that the posts should be made sufficiently attractive to compensate and to secure the right class of men. Health Officers do not make fortunes and it is unreasonable to expect that they should, but at least they should receive an adequate salary to free them from monetary worries and to uphold their status among their fellows. We must take steps to avoid the " duds " of the medical profession finding their way into the health service, and the only method of doing this is to make the prospects of public health service equal to that of other branches of medicine. In the creation of our rural health service, this point requires to be remembered or the scheme will be a failure.

(*b*) I am strongly in favour of Government conducting economic surveys in typical villages to ascertain the economic position of the cultivator. Health Officers should be associated with such survey parties to investigate vital statistics, sanitary conditions such as water-supply conservancy and housing, and the occurrence of epidemic and endemic disease, particularly malaria. Such surveys in typical villages in selected areas will be of the utmost value in supplying us with information upon which to base our policy for the improvement of health conditions in rural areas.

(*c*) No such intensive enquiry has hitherto been carried out in this Province.


Local Government
(Department of Public Health)
Director of Public Health
Commissioner.
Director of Public Instruction.
Section 7. Medical inspection of schools and school children.
Section 5. Malaria surveys and Anti-malarial measures.
Section 3. Laboratories, Water sewage and Food examination. Vaccine manufacture.
Section 1. Epidemiology, Vaccination, Vital statistics.
Section 2. Sanitation, Rural and Urban By-laws.
Section 4. Sanitary engineering, Water Drainage and Sewerage schemes.
Section 6. Organisation, Postings and Transfers, Discipline Accounts.
Voluntary agencies.
Section 8. Publicity propaganda, Child welfare.
Commissioner.
Deputy Commissioner.
Chairman of District Council.
Chairman of Circle Board.
Deputy Commissioner.
President of Municipality.
Rural Branch.
Port Branch.
Urban Branch.
District Health Officer. Full-time officer having executive powers.
School Medical officer.
Port Health Officer. Full-time in large ports. Part-time in small ports
School Medical officer.
Municipal Health Officer. Full-time in large towns. Part-time in small towns.
Epidemic S.A.Ss.
Public Health Inspectors.
Vaccination staff.
Medical Registrar.
Public Health Inspectors.
Vaccination staff.

Oral Evidence.

62625. *The Chairman:* Major Jolly, you are Officiating Director of Public Health, Burma?—Yes.

62626. We have in the publication * entitled "Agriculture in Burma" which is a collection of papers prepared for us by the various heads of departments, a note on public health considerations at page 179; are you familiar with that?—I prepared that.

62627. It appears that malaria and hookworm are the two diseases which the rural population suffers from most severely?—I think you have to add dysentery including diarrhœa.

62628. Cholera, I suppose, is also a serious problem in Burma?—Epidemics like cholera cause a great deal of panic although the actual death rate is not so great as in some of these other diseases.

62629. Of the diseases that lower the fibre of the rural population, malaria and hookworm are the most serious?—I think so, except dysentery including diarrhœa, which is possibly more serious than the hookworm.

62630. And certainly so, I take it, in terms of infant mortality?—Certainly.

62631. I take malaria first; what systematic steps have been taken to deal with malaria?—As regards the Province in general, before the War we had a Malaria Committee, which did certain investigations into malaria in various areas in Burma. That was going for a few years, but was discontinued when the War broke out. And quite recently, three years ago, we appointed a special Malaria Officer; since then we have an Assistant Surgeon whom we have specially trained; we have had three or four Assistant and Sub-Assistant Surgeons of the Public Health Department trained in malaria survey work, and they have been employed on specific malaria surveys in various areas. That gives us some definite information to work upon. In addition to that we have the usual quinine distribution system similar to the other Provinces. When we do a survey we make certain recommendations, and if the funds are available these are carried out as a general rule.

62632. Do you form any view as to the nature of the scheme which may be evolved as a result of these surveys?—The person doing the survey usually makes recommendations; these are then considered by the Department of Public Health and the final recommendations are then made.

62633. Have you formed your own view as to any particular scheme that might be adopted in the future?—You mean regarding any particular survey?

62634. I understood from your answer that, ordinarily speaking, the idea was that these surveys might lead to the evolution of some general policy which might be adopted throughout the Province?—I did not mean that so much as that the malaria problem varies in each locality.

62635. Can you point to any successful results in dealing with malaria?—We are pretty much at the beginning of it, but in Arakan, in the Kyaukpyu district, in the town of Kyaukpyu itself, I think we have made some improvement, although very little money has been spent there.

62636. How was that improvement achieved?—That has been by drainage and stopping wet cultivation. It is still a doubtful matter. As a matter of fact, we have carried out a second survey this season to try and assess what improvement has taken place since the last survey was carried out in 1912. That is the only place in Burma where we have been able to compare the result of a work carried out over a number of years. It has all been so recent and even the report of the second Kyaukpyu survey is not yet in my hands. But the local opinion of the people themselves, and the statistics such as we have, seem to indicate that there has been some improvement, and the people are anxious that we should go on with the work, mainly drainage and reclamation.

62637. Is there *kala-azar* in Burma?—It is not endemic; we get odd cases which, I think, are purely imported.

62638. Is it possible to mistake *kala-azar* for malaria?—It is possible. I think it certainly is possible, as it was so mistaken in India for many

* Not re-printed.

years, but I do not think it would be mistaken if it was investigated by an officer who was thoroughly acquainted with *kala-azar*.

62639. Have you satisfied yourself that the cases which are alleged in Burma to be suffering from malaria are in fact suffering from that disease and not, to a very important extent, from *kala-azar*?—I do not believe we have *kala-azar* in Burma. I do know that many of the cases diagnosed as malaria are not malaria, but we are not yet in a position to improve the diagnosis much. Many cases are diagnosed on purely clinical evidence.

62640. Of course, one is not concerned with particular individual cases. My purpose is to determine whether the error is likely to be so large as substantially to invalidate the statistics?—They are rural areas. We classify malaria along with the big group of fevers; we have no separate head, and we can only guess at its proportion. But as regards *kala-azar*, we have no definite evidence for supposing that it is endemic in Burma. Chittagong is the *kala-azar* area, and Arakan is the area in Burma to my mind which is threatened with *kala-azar*. We have to keep a watch there.

62641. What is your malaria season here?—It varies. Generally speaking, the worst seasons are the beginning of the rains and the end of the rains, the two intermediary seasons.

62642. How does the Burma constitution stand up against malaria as compared with the Indian?—I think that the way in which people's constitution stands up against indigenous malaria does not differ much in different countries. It depends entirely upon the extent to which the race we are considering have become accustomed to their own type of malaria in their own locality. What I mean is that in a particular locality, the permanent residents of that locality have usually acquired considerable resistance to their local type of malaria.

62643. Have you noticed whether the Indian immigrants suffer particularly severely from infections in Burma?—I think they do. I have noticed that in other countries, and I think the same holds good in Burma. I have also noticed that we have evidence of Burmans suffering considerably from infection introduced from India.

62644. Are you satisfied with the state of affairs as regards the supply and distribution of quinine?—I am not. I do not think we distribute enough quinine, either by sale or free. I personally am in favour of giving free quinine to everybody. It is done in Italy, but the financial difficulties involved are so great that I do not think we can consider it at present as a workable measure. Also, I do not think that the amount of quinine, from what I have heard of the Government of India's position, would be forthcoming.

62645. Have you any quinine in reserve?—We do not keep a large stock in reserve. We buy as we require it; we indent yearly.

62646. Have you distributed quinine to school children?—Not to any extent, and not as a special measure. The question of distributing quinine through the schools is at present under the consideration of the Honourable Minister. It has been suggested this year.

62647. Do children suffer very severely from malaria?—Yes.

62648. At what age does infection first take place?—That varies according to the intensity of the local infection. But I think that children are liable from birth, although we usually find that the evidences of malaria are not so marked in children under one year. Taking the spleen count, for example, we do not usually get a very high infection in children under one year.

62649. Does malaria infect children?—It does. It is one of the principal causes of infantile mortality.

62650. When you do distribute quinine, in what form is it mostly distributed?—In tablets of cinchona febrifuge.

62651. Would you state your view as to the relative merits of the various forms in which quinine is used?—I myself prefer giving quinine under solution. I think if one can give it in solution it is always preferable; but, when distributing it on a big scale to the public, solutions are difficult things to handle.

62652. How about the febrifuge form?—It is just as good as pure quinine. It is not so popular, but I think it is as good.

62653. Is the incidence of hookworm general in Burma?—It varies very much in different localities. Recently, we had a bit of research work by Dr. Asa Chandler, of which I have a report. He goes into some detail in the distribution of it in various parts of Burma, and shows how variable it is.

62654. Has there been developed any definite policy dealing with hookworm?—There has been no general policy for the country yet beyond propaganda.

62655. At what is the propaganda directed?—The propaganda is carried on through our Hygiene Publicity Bureau, in spreading information as regards the disease. That is as far as we have got except in one or two small localities. Little has been attempted, at any rate not sufficient, to call it any general policy. We have not got the staff.

62656. Are the habits of the rural population such as to encourage the spread of hookworm?—The habits vary a good deal in different parts of the country. I think one would divide them up according to the habit of using latrines. In Lower Burma, for example, in most of the villages, the custom amongst the Burmese is generally to use latrines. In Upper Burma, it is nothing like so general.

62657. Is that an old established practice?—I think it is.

62658. What form of latrine is used?—It is a very simple latrine, usually a rough framework of wood raised from the ground; beneath the superstructure there is the usual pit, sometimes more or less deep but usually quite shallow, which simply has the effect of localising the excreta in one place.

62659. It is a fairly satisfactory method?—I think it is, from the point of view of hookworm.

62660. Do you find that where that practice obtains, the incidence of hookworm is lower than is the case in districts where no latrines are used?—That does not absolutely hold good, because we have the climatic factor coming in too. For example, in the dry central area of Burma, the hookworms are killed in the soil, whether latrines are used or not, and yet, undoubtedly, the use of latrines would reduce the incidence even under these conditions.

62661. Does it happen that the use of latrines is, in the main, prevalent in those districts in which the climatic conditions are likely to encourage the spread of hookworm? In other words, are the latrines used mainly in the damp areas?—They are mainly used in the damp areas. To that extent I think it is so. It is questionable, however, in the very wet areas, whether the amount of water is not so great that the hookworm would not flourish.

62662. It may be drowned?—It may be drowned or washed away. I think conditions are most favourable for it in the intermediate parts.

62663. Is the wearing of shoes customary in Burma?—In the Shan States they use shoes more than in other parts of Burma.

62664. Do you regard the wearing of shoes as an absolute preventive of hookworm?—Not absolute, because infection may be obtained by passage direct through any part of the skin. For example, an agricultural worker handling contaminated soil or implements might become infected through the hands if conditions were otherwise favourable; but the wearing of shoes is undoubtedly a principal preventive, as infection is mostly through the feet.

62665. Is it your view that a considerable part of that lethargy which is sometimes alleged to be typical of certain sections of the rural population is due to hookworm?—I do not think we have enough data for me to express an opinion as to whether the greater part of it is due to that. Undoubtedly, some of the lethargy is due to that, but I do not think we have enough data to give a more definite reply. I personally do not think that hookworm is the principal cause.

62666. Have you seen the statistics of the results of experiments carried on on the tea plantations in Assam?—I have read various accounts of them from time to time.

62667. Are they not very significant?—They are very significant, but I think plantation conditions are rather different from natural conditions.

62668. You do have a Hygiene Publicity Officer. What exactly does he do?—He has been employed only for a year or two. His first work was to make our material, to construct hygiene publicity material. That was work at headquarters. We have found that the hygiene publicity material prepared for other countries was not suitable for use in Burma; it lacked local colour. We have been engaged for the last year or two in Burmanising this material obtained from other countries, producing lectures, pamphlets, leaflets, magic lantern slides, and posters; and this year, for the first time, we have prepared some cinema film material of that sort. His work was concerned, first and foremost, with that. Then he is in charge of the bureau which distributes it, and he himself, as much as his time permits, tours from place to place, assisting the local authorities at health exhibitions or baby weeks, festivals and shows of various sorts; he also visits the sites of epidemics, and tries to work up a preventive campaign.

62669. Do you introduce a comic element in the films?—We have not intentionally introduced any comic element yet. But it has been suggested, as a matter of fact, by the Honourable Minister that in our next film we should introduce it.

In the Sudan, they had films illustrating the method of infection of some of their more serious parasitical diseases, and some of the parasites were shown in a sort of Charlie Chaplin role. This amused the audience immensely, and it was hoped that they would carry away in their minds a more permanent impression than would have remained if the film had been shown in a more scientific fashion.

62670. On pages 184 and 185 of your paper* you suggest that provision might be made for a district health staff, a transfer of legal powers over health activities to the district councils and a provision of funds from local taxation. Is that part of a policy being considered by Government or is it your own?—That policy is now being considered; as a matter of fact, the day before yesterday the question of a district health service for Burma came before the Finance Committee, who generally approved the scheme.

62671. When do you think it is likely to be given effect to?—I hope that we may begin with it next year, but the development must be very gradual because we have not got the men trained; it must be at most one or two a year, possibly spread over ten years or more.

62672. Do you ever use your subsidised practitioners for public health work?—So far we have not; the scheme is quite new and I think we have only about a dozen.

62673. What calibre of man are you getting amongst these subsidised practitioners?—I am afraid I have not personally had any knowledge of them; they come under the Inspector General of Civil Hospitals.

62674. Have you considered, at all, the possibility of using the co-operative movement for purposes of public health?—We have used it, to a certain extent, for the distribution of quinine; we have supplied a lot of quinine to the co-operative societies.

62675. You have no anti-malaria societies?—We have none so far.

62676. Is it really the case that you are only now, in Burma, at the stage of making the preliminary surveys on which your policy in relation to the major problems of public health must be founded, or do you think your knowledge of conditions generally in the Province is now sufficient?—I think we are still at a fairly preliminary stage; the difficulty has been that we have had no district health service. I mean, full time district health service. And I think I have emphasised in my notes that I do not consider the Civil Surgeon, in his capacity as district health service officer, has had the necessary time to devote to it; I think until we get full time district health officers who should preferably be of the country so as to be able to understand the problems so far as they concern the habits of the people, on which I lay a great deal of stress, we shall not really begin to touch the problems of rural sanitation. Our district health officers have done a great deal in towns but I honestly do not think we have more than touched the fringe of sanitation in the rural areas.

62677. How about the drinking water supply in the rural areas? Has any attention been paid to that?—Very little, a well put down here and there, but very little else.

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*In the Memorandum submitted to the Commission by the Local Government—Not re-printed.

62678. Is it the custom of the people, as a rule, to drink from the moving water in the streams or to drink from ponds?—It depends a good deal on the locality.

62679. And on convenience?—Yes; the riverain population generally resort to the rivers. Up country the usual source is wells or tanks.

62680. Are these rivers heavily infected, as a rule, or is the water reasonably pure?—Practically all of them are certainly contaminated; I do not think there is any river that I know that one would pass according to any accepted standard as potable, without purification; but, of course, it is only now and then that they become infected with a definite disease like cholera, and then they spread it.

62681. Have you applied yourself at all to the problems of nutrition in Burma?—So far as I have had time, I have interested myself in them; there is a very great deal of work to be done and practically none has been done.

62682. Have you formed any general view about the sufficiency or the reverse of the diet of the Burman cultivator?—I think, relatively, he is fairly well nourished.

62683. Are there any signs of deficiency disease?—We get beri-beri in Burma, but it is not a serious disease from the public health point of view at all; we get few outbreaks, mainly in isolated districts, in forests and so on.

62684. Does your experience suggest that beri-beri is, in fact, due to the consumption of polished rice?—Not to that alone.

62685. Do you think that is part of a complex?—I think it is still problematical; here, certainly, our forest epidemics seem to suggest some intoxication.

62686. Have you forest epidemics amongst people who do not consume polished rice?—No; as far as I know, they all consume rice, but not necessarily polished rice. I think actually very little polished rice, in the correct sense of the term, is used in Burma.

62687. That is a very important statement; are you prepared to say it is strictly accurate?—I am speaking from hearsay from experts on rice, but what I gather from them is that polished rice, in the sense in which the term is used technically, is mainly for the export market.

62688. But you cannot tell this Commission that you are satisfied that the villages in which, in fact, these local outbreaks have occurred are villages in which the people do not consume polished rice?—I think the probability is that there is practically no polished rice consumed in this Province.

62689. It is only a probability in your mind?—I would not speak absolutely definitely, but I think it is highly improbable that any polished rice would find its way to these centres.

62690. Is there any lathyrism?—I have heard of none.

62691. Do you regard the problems of nutrition, not merely in Burma but throughout India, as of great importance?—Certainly.

62692. Would you yourself welcome the setting up of a central institution, equipped both in terms of men and material in the best conceivable way, as likely to provide an important service to the public?—Undoubtedly I would; it would be a most valuable institution.

62693. There are problems of a complicated nature which one can hardly conceive being dealt with Province by Province; it is a very highly specialised type of work, is it not?—It undoubtedly is; the only point is that in Burma the diet is in some respects rather different from that in the rest of India.

62694. There is no reason why such a central institution should not, if necessary, for a time at any rate, have its outlying laboratory in Burma for Burmese work?—Then that would meet the requirements of Burma.

62695. *Sir Thomas Middleton:* You have sixteen Sub-Assistant Surgeons employed I think?—That is so, except that we have one or two more now since my note was written; we have nominally twenty, I think, at the present moment.

62696. What is the standard of education of these men? I want you to give me the entrance requirements for the technical schools they study at, and the period of time during which they pursue technical studies?—That all comes under a department which is not under my control; the Inspector General of Civil Hospitals is in charge of the medical training, he is in charge of the Government Medical School; but I know a little about it. The Sub-Assistant Surgeons are all trained in the Government Medical School here in Rangoon. It is a four years' training. I am not quite sure what the initial educational qualification is.

62697. You are not sure that it is the High School Final?—I do not think it is the High School Final; at all events, I do not think that is insisted on. Certainly some of the students who have come to me for training in hygiene do not appear to have had sufficient preliminary education to grasp the subject, and their knowledge of English is also weak.

62698. What is the initial pay of these men?—They start on Rs. 100, that is the Medical Department men; when they come to the Public Health Department we give them Rs. 150; that is, as epidemic Sub-Assistant Surgeons.

62699. You take men who have been several years working in the Medical Department?—Yes, as a rule. We have a mixture; we have some who have been for several years working in the Medical Department and we have some boys who have come fresh from the Government Medical School. The scheme is an experimental and tentative one and we have had difficulty in getting sufficient suitable men.

62700. In all those districts in Burma in which rice is consumed, is fish an important element in the diet?—Undoubtedly it is, a very important element.

62701. Do you know of any district where rice is so largely consumed that it forms the staple food and where no fish is available or eaten?—No, I do not think I know of any district where there is no fish available.

62702. These two go together?—These two, I think, generally go together practically all over the country.

62703. *Dr. Hyder:* Fresh fish or *ngapi*?—Not necessarily fresh fish: *ngapi*, dried fish and salt fish. I think in districts where there is difficulty in getting fresh fish, and at seasons of the year when there is difficulty in getting fresh fish, the population relies a good deal on salt and dried fish and *ngapi* and prawns.

62704. *Sir Thomas Middleton:* Are the Burmese large consumers of eggs?—No, they do not use eggs to any extent at all.

62705. To a small extent?—To a very small extent; in fact, it is rather peculiar how little eggs are made use of. I think there is a tendency nowadays for ducks' eggs and imported eggs to be made use of, but that is a recent development and mainly in the towns; I do not think the rural Burmese use eggs.

62706. They also seldom use milk?—They seldom use milk except, again, for a recent tendency to the consumption of condensed milk, which I think is probably connected with an increasing consumption of tea.

62707. *Mr. Calvert:* Then what takes the place of milk?—It is a little difficult to say. Milk is a more or less balanced food and there are a number of things that take its place. Milk contains all the ingredients, all the component parts: proteins, carbo-hydrates, fats and vitamins, and they get these from a very wide source, mainly the vegetable kingdom. The very wide vegetable sources that the Burman draws upon are, to my mind, the key to his nutrition.

62708. *Sir James MacKenna:* What about his *ngapi*?—*Ngapi* contains protein, to a certain amount; but, after all, *ngapi* is only used as a relish and they do not get a big quantity of protein out of it. I think the average *ngapi* is about sixteen per cent protein, that is all.

62709. *Mr. Calvert:* Do you think the absence of milk in the Burman's diet has any deleterious effect on his physique and health?—That is very difficult to say. If I had been asked that question before I came to Burma, I should have said: "certainly, it must have a deleterious effect": but the fact is that one finds them well nourished without milk, which rather destroys that theory to my mind, that milk is an essential or even a very valuable article of diet in Burma. It does not seem to suit the Burmese and they seem to get on very well without it.

62710. But in the case of babies, is there no alternative to them except mothers' milk?—The majority, of course, are breast fed, but, as far as I can make out, when a baby cannot be breast fed, it has a very difficult time in Burma. They try to feed it with rice and with rice water, sometimes mixed with salt and sometimes with a little jaggery, but I think it has a pretty bad time and must be pretty tough to survive if it is not a breast fed baby.

62711. You make a remark about the overlapping of the Department of Public Health with the Medical Department. Is it your point that they should be separated or that they should work together?—I think it is a matter of personal equation. It depends very much on the heads of the two departments. The point I would bring out is that the tendency has been in past years to subordinate public health to curative medicine. The ideal undoubtedly is to have one department, but I do not think that we have reached a stage of public health development yet when the two things can be safely combined. We should develop our public health further before we contemplate the question of combining, because my fear is that we might again subordinate public health considerations to the claims of curative medicine.

62712. Do you not think that the interests of public health would be better served by having a completely independent department?—I would not say that the time has not yet arrived for that. Again, it depends very much on the view point of the heads of the two different departments and of course of the Honourable Minister in charge.

62713. What is your Public Health Board?—You mean the Provincial Public Health Board? That is practically entirely concerned with the distribution of grants. That is its main function. It distributes the money that is allotted by the Provincial Government for public health projects.

62714. Is the membership non-official?—It has a non-official majority.

62715. You have, in Burma, a large number of Punjabis?—Yes, a fair number.

62716. Do you notice any difference in physique between the Burman and the Punjabi?—The Punjabi is an exceptionally fine specimen physically, but the Burman is also a very fine specimen. Each specimen has got its own special racial characteristics. The Burman is also a well nourished individual. They are very difficult to compare but I think that both are very good types.

62717. How do they compare so far as physical labour is concerned?—I should not say there is much difference. Both are good. I always think that the man of any particular country or locality works better in that particular locality than an imported man, because he has usually more resisting power. He can resist the climate and the diseases of the locality.

62718. It is rather peculiar that you should have a very considerable immigration of the Punjabis into Burma. There are practically no Burmans in the Punjab?—That seems to me more an economic question.

62719. *Mr. Calvert:* Could you throw some light on the relative effects of the difference in diet?—I personally am inclined, from what I have seen, to differ, for example, from Colonel McCarrison's views which would condemn the Burman for having a low value staple. I would not say that because the Burman's staple food is rice, therefore he must have low resisting power. From what I have seen, I think they have got very good resisting power. They are a very well nourished race and I think that comes from the very wide use they make of green leaves, vegetables and roots and a whole host of vegetable products that are hardly touched in India, for example, they have beans and pulses which are allowed to germinate are full of vitamins. They are a highly nutritive diet, and are very largely consumed in Burma. What is done is this: The pulses and peas and beans are simply spread out in trays or put in vessels moistened with water and allowed to germinate. They are eaten raw or pickled or lightly cooked. This food has recently been recommended in times of epidemics of scurvy throughout the world. It had been used in Burma and China for centuries before it was rediscovered.

62720. *Dr. Hyder:* Does not the Punjabi policeman who comes over here change his diet and go over to the Burmese diet?—I am afraid I do not know much about that. I cannot give any definite information.

62721. Is there any particular season in which outbreaks of cholera occur in Lower Burma?—Yes, it varies a good deal from year to year but, generally speaking, outbreaks begin in the dry weather when the wells are low. We usually begin to get cases in the delta, then the disease spreads inland.

62722. Does your dry weather in Lower Burma coincide with the harvest period?—No, I do not think so. The harvest is before the typical hot weather season in which our cholera occurs.

62723. When there is scarcity of water after the harvest, then it is that you have outbreaks? So far as cholera is concerned, you could stop such outbreaks if you had a good water-supply in Lower Burma?—That is the whole problem.

62724. *Mr. Reynolds:* Would you subscribe to the view that malaria in Burma is almost entirely a disease of the forests and foot hills, that once an extensive area in a district has been brought under complete cultivation for a series of years, then malaria is no longer a serious proposition?—I think that that very largely expresses the position, not absolutely, but undoubtedly in the main it is so. We have exceptions here and there which occur to me, but in the main I agree.

62725. Are not the exceptions you refer to cases where areas are still within reach of, or connected up to, malarial areas?—That also holds good to a very large extent.

62726. So that, more important than quinine or drainage is the question of the clearing of forest growth in order to get rid of malaria?—Undoubtedly, complete cultivation is one of the principal factors in getting rid of malaria. Wherever we bring a country under complete cultivation, malaria tends to disappear.

62727. Can you think of any densely occupied and cultivated district in Lower Burma, however much water there may be, which suffers badly from malaria?—Lower Burma is not so bad for malaria as Upper Burma. It is possibly because of the water and the free flooding. That is undoubtedly a factor which we have got to consider. Malaria, after all, can be stopped by making a country a wilderness or by cultivating it fully, but, where you have got sufficient water to flood, you do not get malaria.

62728. *The Raja of Parlakimedi:* With regard to the influence which the opening up of communications has upon rural health, do you think there are sufficient roads in these areas?—I have indicated, in my note, that roads cut both ways. They may improve economic conditions but they may also spread disease. That is a point we have got to consider. At the same time I would not suggest that we should stop road making, but before we improve communications we must organise the district health service to meet the dangers that will arise out of these increased communications.

62729. How do you organise your district staff?—Here we have districts and circles.

62730. How many talukas does a circle include?—We do not have talukas in Burma at all.

62731. Is a circle equal to a revenue sub-division?—The system here is rather confusing. We used to have the districts and the townships. In the districts a circle is about the same area as a township. A township is divided into several sub-divisions and the matter is rendered more confusing because we still have townships and circles going on together, but actually I think I am right in saying that a district usually has about ten circles. I would personally organise a district health service in the meantime on the basis of a full-time District Health Officer per district and a full-time qualified Sanitary Inspector per circle. A district has a population roughly of 300,000 and a circle roughly of 30,000 and if, in the next few years, we can get a District Health Officer per district and a Sanitary Inspector per circle, we will have done all that we can hope for in the near future. Eventually, we must develop very much more than that. The circle itself is not too small an area in the future to have its full-time Circle Health Officer.

62732. How many dispensaries do you have per circle?—I am afraid I cannot tell you that.

62733. Do you think the number is sufficient?—Do you mean from the public health point of view or from the point of view of the cure of diseases?

62734. Both?—The dispensary itself, as a dispensary, does not help us much in the matter of public health. It is mainly for the distribution of medicines and for the treatment of disease.

62735. No sanitary officer is attached?—No. The medical subordinate in charge of it is the Sub-Assistant Surgeon. It has been laid down by Government that it is his duty to perform public health work if he is called upon to do so. In some cases they are of great value but they have their medical work to do, which has a prior claim on them. I really do not think that they have very much time left to do public health work extensively.

62736. Are qualified men available in the dispensaries?—They are not qualified from the public health point of view. They are all undoubtedly qualified for medical work and even for the medical work they are too few.

62737. Only one Sub-Assistant Surgeon per dispensary?—Yes.

62738. Are any lady doctors available?—I do not know whether there are any lady doctors in dispensaries. I have not come across any. In the larger hospitals we find them, but not in the dispensaries, I think. It is not under my department and I cannot give you definite information.

62739. Is any provision made in the medical budget for treating women's diseases?—Except in the bigger centres I do not think we have any special provision. Where it exists we have separate wards for men and separate wards for women in the hospitals and in the dispensaries.

62740. Do you provide first aid in delivery cases?—This matter comes under the Inspector-General of Civil Hospitals. There is a system of training midwives. When they are trained they are sent into the districts.

62741. Is there a large number of them?—I do not think these are anything like enough.

62742. Have you any opinion to offer under that head?—That does not concern my department so much as it does the medical side; it is quite separate from the Public Health Department; it comes under the Inspector-General of Civil Hospitals and under curative medicine; we have enough to do in our own line.

62743. Do you not think that it would be a good thing if the District Health Officer had a hand in supervising the health and welfare of the people?—I think we should. At present the District Health Officer is the Civil Surgeon. He is one officer serving in both capacities and he has an extremely difficult job so that personally I think it is hopeless for us to expect him to do both; he cannot do both; he is a very hardly tried and very much overworked officer; he has many calls upon his time; his medical work must come first; he has a private practice which after all in an isolated district he must do, as often there is nobody else to do it. We have never disputed the necessity for Civil Surgeons to carry on their private practice but we think we should have full-time district officers who will not indulge in private work but will devote the whole of their time to one job. The two things do not combine well and should be kept separate.

62744. Have you get municipalities in these townships?—Yes.

62745. What is the practice? Do they maintain their own dispensaries? —They have a hospital committee scheme under the Reforms, hospital finance committees on which the various local bodies are represented (such as the municipality and the district council) where a hospital takes patients from both, and they run their own show under the general technical supervision of the Inspector-General of Civil Hospitals.

62746. Do they receive any aid from the district boards?—They get financial grants from all the bodies interested.

62747. And also from provincial revenues?—Yes, you will find a hospital in a municipality getting a grant from the district council as well as from provincial sources.

62748. Does the District Medical Officer have a sufficient hold upon the hospitals maintained by municipalities?—Again that is not my department and I find it a little difficult to answer, but I think I have never heard of complaints on that score. I think that, technically, in the conduct of his hospital he is left with a pretty free hand and on all technical matters he is inspected by the Inspector-General of Civil Hospitals, who looks after that side of it. I do not think that there is any complaint of unnecessary interference.

62749. And does this medical officer hold his appointment under the municipal chairman?—He is a Government officer.

62750. What movement is on foot for child welfare in rural areas?—There is practically nothing at present. We have begun with child welfare societies, but, as usually happens, these start first in the towns, and one hopes the movement will spread to the districts. The Red Cross is doing a little in assisting these societies financially, but in the districts we have hardly done anything yet. We can do nothing much until we have a fundamental basic health service upon which we can build. All these questions, to my mind, can only come logically when we have got our fundamental health service. Till then we cannot really advance.

62751. Are any child welfare shows held?—Yes, in the towns. We have had one every year in Rangoon, and others have been held in Mandalay, Bassein and other parts of the Province. In some cases they have tried to combine them with the agricultural shows.

62752. With regard to infant diet, I suppose sufficient demonstration is given to the people, showing what is the best thing to adopt for infants?—Yes, that is a fundamental part of these child welfare shows.

62753. *Sir James MacKenna:* Have you a public health institution in Burma?—Yes, it was opened last year.

62754. Is it well equipped?—Yes.

62755. What lines of investigation have you started?—We have not done very much as yet. The institution was built with three objects : first, for teaching, secondly, for public health laboratories which we have never had before, and, thirdly, for research or investigation, and so far we have had a good deal of teaching to do. We are doing all the teaching we can do at present. We have a chemical and a bacteriological side to the institute and have taken over most of the routine public health laboratory work which has hitherto been done, so far as it has been done, in other institutes. We have hardly had the time to start on investigation, and in that respect we have done very little. We have started investigation in foodstuffs, into *ngapi* to find out its composition, to what extent it is adulterated, and then again we have done a little investigation on wells with regard to the contamination of tube well waters. But we are merely making a beginning with these things. We have got a malaria bureau which has just been sanctioned.

62756. Would you say that there has been a great awakening of public interest in Burma in matters of public health in recent years?—I think so.

62757. Have you formed any impression of the attitude of the Legislative Council to public health questions?—I think it is very favourable.

62758. Has the Finance Committee been sympathetic in regard to public health schemes?—I do not know whether we hold a record or not, but I think I am right in saying that the Finance Committee has turned down no project that the Public Health Department has ever put before it.

62759. Have you had any experience as a Public Health Officer in other Provinces in India except Delhi?—I was Health Officer at Delhi. Before the War I was appointed to Bombay, but the War prevented my taking up the appointment. On military service I have had public health experience in Africa.

62760. Would you say that there are indications that the Public Health Department in Burma is likely to develop into a very big department in comparison with those of the rest of the Provinces?—I think so.

62761. Are you familiar with these reclamation schemes which have been carried out in the Delta by pumping up silt from the rivers?—I have seen them in process and after they have been completed.

62762. Would you say that this would tend considerably to improve the public health of Burma?—Undoubtedly.

62763. With regard to your posters, do you not think that some of them are over-emphasised to the extent of frightening the people?—I do not think that they frighten the Burmese people.

62764. *Professor Gangulee:* For the investigation of public health problems and for your malarial bureau, do you receive any grant from any other source outside the Province?—We have had grants given us by India. For example, there was a grant given for beri-beri research. There have been several grants given to the Pasteur Institute for special lines of research work. So far, we have not applied for any grant for work undertaken by the Public Health Department because our Institute is new.

62765. You receive these grants from the Government of India?—Yes, from the Indian Research Fund Association.

62766. Under what conditions?—For specific problems. The details are submitted and approved.

62767. Do the Government of India supply officers to carry out the work or do you depend on your own officers?—We have not, as a department, done anything in that line as yet. But I understand the position is that they are short of officers, but they afford us all the help that it is possible for them to give.

62768. Have you had any assistance from the Rockefeller Institute?—Not yet.

62769. Have you any Public Health Act in this Province?—There is no separate Public Health Act.

62770. Do you think that there is need for one?—Yes.

62771. What proportion of the total public health budget is spent actually in rural areas?—I am afraid I cannot give you that information straightaway; it must I think be very small.

62772. In the new scheme that you propose here, is there any provision for a substantial increase in rural public health service?—The scheme has been put up to Government as a suggested line of development, and we are working on it now. We have just had the approval of the Finance Committee to a full-time officer in charge of the Public Health Institute, who will develop into an Assistant Director in charge of Pubilc Health Laboratories. A proposal is now before Government for an Assistant Director of Public Health for Schools, and no orders have yet been issued.

62773. At present I understand from your note that you have got some twenty-six Public Health Inspectors for the whole Province?—We have only twenty-six in the districts, and to make an impression on public opinion we must have a minimum of one per circle, which means 287.

62774. Under the new scheme that you are proposing, the number of Inspectors will be increased?—No, the chart here only indicates the increase in the central department. But the scheme for an increase in Sanitary Inspectors will depend partly upon the district councils themselves as they have the power to appoint them, partly upon the numbers we can manage to train and turn out, and partly on the extent to which the Local Government will stimulate and urge the district councils to employ them. We have just made a beginning in the districts.

62775. Since the recent grant of a measure of local self-government have you found that there is a real demand for sanitary improvement and public health services in the districts?—I think it is beginning to come. Again, it is one of the things that is just at the beginning. I think, however, that the grant of local self-government has undoubtedly stimulated it and that the demand will steadily increase. I find, going round now, that there is an increasing interest amongst the members and the chairmen of district councils in public health matters. They are still very largely at the questioning stage and still very ignorant of what it means, but their interest has been roused and that is the first stage.

62776. But are they prepared to find money for schemes?—That is one of the difficulties at all events. They have not got the money at present to do very much. I have talked it over with many officers of Government

who are more directly concerned with taxation than I am, and it all depends on whether the Government can give them more money and whether they themselves realise that public health is of sufficient importance to allow of further taxation being imposed to obtain the money.

62777. You state that district councils have been brought into being only recently and they are only nominally responsible for the care of the health of the people; you also state that they will require staff and legal powers; what legal powers are you thinking of?—There are certain powers which are still with Government officials, which might be transferred to district councils; various powers such as the village headmen have in connection with the fundamentals of the village sanitation might be transferred. There was, in fact, a proposal (I think it is still under consideration) that village headmen should, as far as their public health functions are concerned, act as the servants of the circle board.

62778. With regard to the habits of the people, you say that the personal hygiene of the Burman is satisfactory and, on the whole, he is very clean; you say their instincts are towards cleanliness, but their environment is against them?—Yes.

62779. Do you see any change in this environment in recent years?—It is only six years since I came to Burma, but of course I have discussed the point with men who have spent their lives here, and the general opinion I have gathered is that so far as the villager is concerned, we have hardly touched him, but in the towns there has been a good deal of change.

62780. Do you think there is any social prejudice amongst the people which stands in the way of the improvement of their environment?—There is only one which I can think of at the moment, and that is the difficulty about anti-rat operations in plague; the Buddhist Burman does not like killing rats. That is the only prejudice of that nature that comes to my mind.

62781. Is there any prejudice against vaccination?—None whatsoever.

62782. *Dr. Hyder:* Is there plague in China?—Yes.

62783. In Japan?—In Japan they had it, but they have pretty well cleared it out now.

62784. Do they have any objection to killing rats in Japan?—I have never heard of that difficulty arising in China or Japan.

62785. *Professor Gangulee:* What assistance do you get from non-official bodies in your propaganda work?—We get assistance from some; some of them help us to distribute our material; we send copies to them; some of them help by convening meetings and giving addresses themselves.

62786. You told us that the hookworm index is more in the intermediate belt between the delta and the central zone; why should it be so?—I think it is because the rainfall and heat there are just about the right degree to favour the development of the worm. Excessive heat kills the worm, and excessive rains will wash it away. If you get a condition somewhere between, it is favourable to the development of the worm.

62787. *Mr. Kamat:* You have given us a graphic description of the sanitary conditions in rural areas, and in your note you have emphasised the need for a district health service entrusted to the district councils for actual working. Would you not agree that the problem is not purely one of administrative machinery, of having a health service (of course, I recognise the great importance of having a health service), but that the problem is one of educating public opinion on ideas of sanitation?—I absolutely agree; in fact, I think the main function of the health service will be education for many years.

62788. For the purpose of educating public opinion, that is to say, to give correct ideas about sanitation to the villagers, do you hope to depend only on the health service?—Not to depend on them only, but I think they will have to be our principal agents and our initial missionaries (as I would call them) of public health to start the movement.

62789. If you analyse the causes of the present state of things you will recognise that there are two factors which are responsible; the first is the ignorance of the people, and the second is their economic situation?—Undoubtedly.

62790. For instance, when a public health officer advocates better housing, or that the men should have separate accommodation for themselves and not live in the same hut with their cattle, it resolves itself into an economic question. The root causes are, therefore, the ignorance of the people and the economic position of the people?—Undoubtedly.

62791. The first factor, you will tackle to some extent by means of your public health service. Do you not think that there is need of enlisting the sympathy of the Education Department also and getting them to educate the people, by means of text-books, to a sense of the unhygienic nature of some of their habits?—Certainly.

62792. Probably, therefore, the question is also one of the spread of general education and not merely of having a public health service?—Yes.

62793. Taking that into consideration, would you immediately resort to legislation such as a Public Health Act to enforce certain of your hygienic rules in the villages (I am talking of village sanitation), or would you leave it to time and the education of public opinion?—I think it is very difficult to give a general answer. The cases would have to be considered as they came up. There are two methods of sanitary reform—one, entirely autocratic, which was administered in the Panama Canal with the use of an immense amount of force and an immense amount of money, and it did succeed in eliminating malaria from there; the other is the democratic method which we are adopting in Burma. In Burma, I think, we have now definitely abandoned the idea of introducing any important health reforms by autocratic methods. We must rely, in the main, upon the education of the people and the advancement of public opinion for improving our conditions.

62794. Just visualise an ordinary villager. I want you to specify how far you would go with your present educational methods through your service, and at what stage you would step in with legislation? For instance, rubbish is left to rot and a lot of flies breed or latrines are not properly kept. Supposing you want to improve this condition by legislation, would you wait five years or ten years?—I think that would depend upon the rapidity of the development of opinion among the members of the district councils and circle boards. I do not think we would enforce these things from the central organisation. We would make the necessary suggestions to the local bodies and leave it to them. As a matter of fact, we have already found some local bodies which are more progressive than others. Some are going ahead more quickly and some are lagging behind. I expect that in the next few years there will be a sort of patchwork progress. It depends very much upon the rate of progress of the individual local bodies. When they think themselves that it is safe to take a step forward, I think we should assist them to do so.

62795. If you leave it to individual district councils, the result will be spasmodic?—It would be our job to stimulate and educate district councils to take action and when the district councils are prepared to take action it is for them, by means of by-laws, to bring in detailed improvements such as you suggest.

62796. I am asking you whether the time has come, in your opinion, to apply the method of legislation all round, say, within the next five years?—Certainly. As soon as we get an adequate service of district health officers I would like to see elementary by-laws enforced by district councils.

62797. That is so far an enforcement is concerned. You wish to wait only till district health officers are available for the purpose of carrying out the law. From the point of view of the state of literacy, do you think the time has come when the law should intervene and that a Public Health Act could be immediately enforced for the benefit of villages?—Some improvements, I think, we could start straightaway to-morrow; many of them would undoubtedly have to wait. Those which do not affect fundamentally the habits of the people we can introduce earlier; those which do affect fundamentally the habits of the people will have to wait until the gradual spread of education makes it possible to bring them into force.

62798. In other words, if you frame a Public Health Act, you will have to frame two sets of rules, one that could be enforced immediately and

another which could be enforced at the discretion of local boards later on?—Undoubtedly, unless we had an Act which left wide powers of discretion to the district councils to use what rules they consider it fit to enforce at a particular stage.

62799. *U Ba Cho :* You say on page 182 of your paper *: "The villager in Burma spends his life from birth to death in surroundings admirably adapted to the development and spread of communicable disease." Would you amplify that statement?—For example, he drinks water which is, in the main, polluted; his villages are infested with flies which are the carriers of a host of diseases; he lives in close association with, cheek by jowl with, rats, in primitive houses, so that he has, at his very door, the actual means for the spread of disease and it only wants the introduction of infection to light up an epidemic; the line of defence is weak.

62800. Do you mean to say that the man in the village is more subjected to disease than his brother in the town?—No; the converse is true, except of course in certain diseases. Speaking very generally, the converse holds good, but undoubtedly, in regard to some diseases, the villagers are more susceptible than the town dwellers. One has to make exceptions and cannot make a generalisation.

62801. There is a persistent rumour that a new disease called *makkalam* has come into Burma and means to stay here, and that it has done much damage to the population of Burma. Would you tell the Commission whether that rumour is true, and if so, how far it is true?—*Makkalam*, to my mind, is a name, not a disease. It was introduced from the Shan States where, as far as we know, the name was first used about ten years ago.

62802. *The Chairman :* To describe what?—It comes from Shan words. As far as I remember, one syllable means "fruit"; the other means, I think, "get black." The exact significance is obscure. At all events, it is a name which has been introduced from the Shan States. That name has spread over a very large number of districts, and a great deal of disease has been diagnosed by the indigenous practitioners as *makkalam*. For four or five years, we have been investigating it wherever it has been reported, through district health officers, Civil Surgeons and medical subordinates, and we have known that the name covers a host of diseases. The majority of the cases have turned out to be malaria; some, on investigation, have turned out to be enteric fever, some have turned out to be anthrax, and some have turned out to be cases of plague, cholera and smallpox which are notifiable and were not notified, having been conveniently classed as *makkalam*, and so on. A Commission has recently been appointed and has just submitted its report to Government and its finding is pretty much what I have said.

62803. It is pretty much the same as influenza, which covered a number of diseases?—Precisely. Undoubtedly, in many places ignorant people believe in it, and I hope that the Government Commission which has independently investigated it will help to prevent the illusion spreading further.

62804. *U Ba Cho :* Do you consider the ordinary diet of the average village cultivator to be sufficiently nourishing?—I think that it compares very favourably with the ordinary diet of the average Indian cultivator.

62805. You say that the wearing of shoes is a kind of protection against hookworm disease. Do you mean shoes of the European type?—Not necessarily; I have included all types.

62806. Burmese sandals also?—Yes.

62807. Did you notice that the hookworm disease is more prevalent amongst the Shan people, who eat raw meat?—No. I think, so far as our figures go, it is less prevalent amongst the Shans.

62808. Do you know that the Shans have a specific remedy for it?—I do not know that.

62809. Just behind Government House there is a Shan physician who claims that he has a specific remedy for hookworm?—They have many drugs of their own. For example, for *makkalam* snake's bile was shown to me as a special remedy.

62810. By polished rice, do you mean rice of which the outer kernel has been taken away?—We are speaking of that as milled rice, or highly milled

* In the Memorandum submitted to the Commission by the Local Government—Not re-printed.

rice. Polished rice, I think, is understood by rice experts to mean that it has been actually polished by leather, or sheepskin.

62811. The ordinary rice that we eat cannot be called polished rice?—No. I would not personally describe it as highly polished rice, or even as polished rice.

62812. Would you distinguish, from the point of view of nourishment, between rice eaten by ordinary people and the rice that is given to prisoners in the jail? You will notice that the rice given to prisoners is not so polished?—It is not milled; I think it is mostly hand-pounded.

62813. Only the outer husk of that rice is taken away?—Yes, it is very red.

62814. Would you say that that rice is better than the white rice that we eat?—Undoubtedly. It is certainly preferable.

62815. *Dr. Hyder:* What is the name of the foodstuff that you say the Chinese have been using for centuries?—They call it *pe-bin-pank*. They use various grains. It is the process that is important. They use *dals*, beans and peas, and I believe they also use cotton seeds, which they germinate in this way: by spreading them in baskets, saturating them with water, and letting the shoots come out. A small radicle and leaf shoot out, and then they eat it. They eat the whole thing, the radicle, the shoot and the bean. They get all the three vitamins at once.

62816. *Sir Thomas Middleton:* Do they use cotton seed?—I was told a little while ago by my chemical analyst that he had seen them making use of cotton seed in the same way.

(The witness withdrew.)

The Commission then adjourned till 10 a.m. on Saturday, the 5th November, 1927.

Saturday, November 5th, 1927.

RANGOON.

PRESENT:

The MARQUESS OF LINLITHGOW, D.L. (*Chairman*).

Sir THOMAS MIDDLETON, K.B.E., C.B.
Sir JAMES MACKENNA, KT., C.I.E., I.C.S.
Mr. H. CALVERT, C.I.E., I.C.S.
Raja Sri KRISHNA CHANDRA GAJAPATI NARAYANA DEO of Parlakimedi.
Professor N. GANGULEE.
Dr. L. K. HYDER.
Mr. B. S. KAMAT.

Mr. H. O. REYNOLDS, I.C.S.
U BA CHO. } (*Co-opted Members*).

Mr. J. A. MADAN, I.C.S.
Mr. F. W. H. SMITH. } (*Joint Secretaries*).

U BA MAUNG, Honorary Organiser, Einme.

Replies to the Questionnaire.

QUESTION 1.—RESEARCH.—(*b*) There are no skilled workers and they are wanted. There is a want of fields for practical demonstration. There is an insufficiency of laboratories. Owing to want of funds, the cultivation work is handicapped and delayed and therefore progress is retarded.

(*c*) I can offer suggestions. The seed-grains supplied by the Government are not of the kind wanted by the people. The kind of seed-grains approved of or liked by the people should be ascertained and supplied. Owing to want of routes or pathways by which cattle can be sent out of the paddy-fields to the grazing-grounds, the cultivators are put to great hardship on account of their cattle, and ways and means should be devised to ameliorate their condition in this respect. Ways and means should be devised to put an end to the construction of *bunds* or high embankments as, owing to the presence of these *bunds* or embankments which prevent the flowing away of the water downwards after it has flowed into a particular field, the paddy-land lying in the upper region has to suffer all the flowing-in of water from elsewhere without any outlet to drain off the same and in consequence all the paddy crops are submerged and destroyed. Construction of *bunds* in the creeks and fishery tracts in the neighbourhood of cultivators' holdings, except where Government has given permission, should be prohibited and heavy penalties meted out. The evil practice of *bund*-construction not only causes scarcity of drinking water for the cattle of the cultivators and thus does harm, but also brings about scarcity of drinking water for the cultivators themselves.

QUESTION 2.—AGRICULTURAL EDUCATION.—(*i*) The supply of teachers and institutions is not sufficient.

(*ii*) There is need for extension of teaching facilities.

(*iii*) Those who have passed the qualifying tests for teachers and are well conversant with the methods of account-keeping in accordance with the rules of co-operative societies and with the science of agriculture should be appointed.

(*iv*) The attendances at existing institutions are not as numerous as I would expect. I can state reasons for this. The absence of any desire to acquire education can be attributed to the fact that even after a man has passed the seventh standard examination in Burmese, there is no one who would need his services on the score of his education and therefore there is a lack of any keenness or eagerness in the acquisition of education. If more encouragement were given to Burmese education by providing work and employment according to educational qualifications, keenness and eagerness to acquire education would be very much fostered.

(*v*) Agriculture should certainly form one of the subjects of instruction in the curriculum of all schools and educational institutions.

(*vi*) In this district the pupils are mainly from the agricultural classes.

(*vii*) Modifications are called for in existing courses of study. Co-operative methods and rules should form one subject of study. Promotion to a higher class should be given only after a pass in the subjects of agriculture and co-operation. These two subjects should be taught to the pupils in the fourth and fifth standards. For teaching these two subjects the teacher should be given additional remuneration.

(*viii*) No special suggestion need be offered in this respect in view of my remarks regarding Question 2 (*v*) and (*vii*).

As there is already a suggestion regarding Question 2 (*v*) that agriculture should form a subject, the Government should allot ample plots for school gardens in every place where there is a school.

(*ix*) At present the students who have studied agriculture are employed in the Agricultural Department. None of them has been doing agriculture on his own account for a living.

(*xi*) None yet.

(*xii*) If special interest were taken by the elders of the locality and libraries were provided to attain this end, they would be made use of and much experience could be gained thereby. Being adults they would feel ashamed to go to school to learn as they would have to go to lower classes. If, as suggested above, libraries are opened, adults can do their own self-study and their knowledge can be increased and widened, thus popularising adult education.

(*xiii*) Without making the children pay any fee for their education, the amount of school-fee according to the number of pupil should be ascertained and under the control of the elders of a locality a nominal, small, educational tax should be levied and paid to the teacher.

In my opinion, without giving the teacher any salary he should be given grants-in-aid in the shape of a reward as was the practice before. By this method of giving the teacher some grants-in-aid in the form of a reward, a spirit of keen diligence would be engendered to give the children a sound and thorough education so as to get passes for them, as the teacher can derive a material benefit only when his pupils have acquired education and gained a pass in their examinations. The present-day teachers do not care whether their pupils gain any knowledge or education or not; they simply live on the expectation of getting their pay when the days run out. Therefore it is desirable that the old system of paying teachers in the form of rewards should be reverted to.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(*a*) With regard to the measures which in my view have been successful in influencing and improving the practice of cultivators: the paddy seed-grains distributed and sold by Government have thrived and prospered in some paddy-lands; however, although they are good, as the distribution of these seed-grains is not made with due regard to the state of the paddy-land and the condition of the water, they have not in other paddy-lands been attended with success.

(*b*) After finishing the work of the paddy-land (harvesting or preparation) as early as possible, storing or draining of water on or from the land according as the water on the land is little or much should be made and then care should be taken to plough the land thoroughly so as to get the required softness and evenness in the composition of the soil. The water on the land should also be made to stand still; if not, the paddy-

U Ba Maung]

plants will get uprooted, some will die and some, owing to the infirm nature of their roots, will become weakened. A great deal of care and attention also are required to give as much protection as possible to the paddy-plants from the usual ravages of rats, pests, insects and crabs. The method of feeding the land with some manure is a far better one. The above are the methods usually followed by the cultivators as far as I know and I offer them as suggestions for increasing the effectiveness of cultivation.

(*d*) With regard to the question of the success or failure of demonstration and propaganda work, there has been a failure to follow the instructions as demonstrations could not be shown and carried out so as to arouse a desire, in the minds of those who saw, to seek after knowledge in this respect. For example, in making demonstrations, it is only when the minds of those wishing to give them a trial could be attracted to these demonstrations, that the same would be followed and acted upon; even though the demonstrations are followed and acted upon by those who favour the same, if the same turn out to be unsuccessful, those who have been experimenting with them would not say anything good about them but would talk of the same according to their will or fancy and thus the propaganda work is retarded thereby.

QUESTION 4.—ADMINISTRATION.—(*a*) I suggest the extension of the present activities of the Government of India.

(*b*) It is my opinion that by increasing the scientific staff of the Government of India, better scientific knowledge could be supplied. If scientific knowledge were imparted by experts publishing and distributing the same, knowledge and understanding would increase day by day. This can be achieved under the control of one or two persons from each district.

(*c*) From the agricultural standpoint the services mentioned in Question 4 (*c*) (*i*) to (*vi*) are satisfactory.

QUESTION 5.—FINANCE.—(*a*) I am of opinion that with a view to giving monetary assistance to the cultivators for better working and improvement of their practices, Government should advance loans to them according to their needs and requirements for a term of one year at the most at a rate of interest not exceeding Re. 1 on some kind of mortgage security so that no loss should be occasioned to the Government thereby.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—(*a*) (*i*) The main causes of borrowing in my opinion are: failure of crops owing to ravages of pests and insects such as rats, etc., destruction by floods or drought, the high cost of living, demand for higher wages by the labourers, loss of money occasioned by the absconding of labourers, increased prices of clothes, etc.

(*ii*) The sources of credit are: the wealthy persons in the locality and the *chetties* from whom the loans are usually taken.

(*iii*) The reasons preventing repayment are: the high rates of interests charged, the profits exacted on paddy-supply advances and on ordinary loans, the large amounts of money expended as the original outlay and further expenses on paddy land.

(*b*) By such measures as fixing the rates of interest on loans (the interest being fixed by the month) and the wages for labour, and the passing of some laws binding on the labourers in order to prevent any monetary losses that may be occasioned to the cultivators on account of the labourers, the burden will be very much lightened.

(*c*) Special measures should, in my opinion, be taken to restrict or control the credit of cultivator such as the right of mortgage and at the same time to secure cheap rates of interest also.

QUESTION 8.—IRRIGATION.—(*a*) (*i*) The over-abundance of water in the Irrawaddy Division has caused destruction of paddy crops.

(*ii*) Tanks should be provided and some of the fishery canals should be done away with.

(*iii*) Wells also should be provided. The districts that do not admit of introduction or extension of any irrigation scheme are Myaungmya, Maubin, Henzada and Pyapôn, whilst there is a possibility of introducing or extending the scheme of irrigation in Thabaung tract in Bassein district.

(*b*) I am satisfied with existing methods of water-supply for irrigation.

QUESTION 9.—SOILS.—(*a*) (*i*) The soils improve either by drainage or by irrigation.

(*iii*) The floods should be prevented.

(*b*) (*i*) Paddy-lands improve by the flowing in of fresh and muddy water.

(*ii*) Paddy-lands deteriorate owing to inundation of salt water or an excessive quantity of water, which does not permit of any paddy cultivation.

(*c*) To reclaim the lands left uncultivated the Government should construct *bunds*.

QUESTION 10.—FERTILISERS.—(*a*) If the cultivators living in the charge of a particular headman are called together and the preparation of fertilisers to be used on the new soils is shown to them by practical demonstration, the same would, in my opinion, be used quite freely provided the demonstrations should prove equal to what has been claimed for them.

(*d*) The localities in which a considerable increase in the use of manures has taken place are the paddy-lands lying on high grounds.

QUESTION 15.—VETERINARY.—(*a*) The Civil Veterinary Department should be under the Director of Agriculture.

(*b*) (*i*) Some of the dispensaries are under the control of local (district) boards. This system is not commendable.

(*ii*) It would, in my opinion, be far better if the Veterinary Inspector were placed under the control of the district board and the Veterinary Assistant under the control of the circle board.

(*c*) The agriculturists do not make as full a use of the veterinary dispensaries as should be. It is advisable to keep two Veterinary Assistants, one to remain at the dispensary, the other to visit the scene of an outbreak of disease for treatment. It is advisable to build a veterinary dispensary in order to attract the attention of the agriculturists.

QUESTION 22.—CO-OPERATION.—(*a*) (*i*) If the Government would appoint one Co-operative *Myoôk* (Junior Assistant Registrar) in every district and look for and keep honorary workers (organisers) as was the arrangement at the first inception of the Co-operative Department, the societies would, it is hoped, grow day by day. The societies already formed and in existence should be instructed in matters in which they are wanting in knowledge. After societies have been formed as a result of the lecturing and propaganda work done by the honorary organisers, these honorary organisers should not be dispensed with merely on the ground of lack of the required knowledge to carry on the societies without giving them instruction. Want of knowledge or ignorance should be overcome by imparting knowledge. The Government should see to it that in cases of loans borrowed and given as between the members of co-operative societies the interest charged should not be higher than eight annas in each case and that in suits filed in courts of law where there is rivalry between the claims made by the members of the co-operative societies for the monies lent by them and the claims of other private individuals, a decree should in the first instance be passed in respect of the claims of the societies and a decree should be given in respect of the claims of the private individuals of the locality, only if and when there is a surplus of money to go to the second decree. In my humble opinion, a law should be passed preventing the imprisonment of the defendant in execution of a decree passed by a civil court in respect of the claims made by private individuals. It is also advisable for the funds held by the Government earmarked for the purpose of giving agricultural advances to be transferred to the Co-operative Department. The cultivators and jungle folk will only take to the idea of forming co-operative societies if some of the officers in the Co-operative Department associate freely and in more intimate intercourse with the members of the societies, after the manner of the late Registrar of Co-operative Societies, Mr. Dunn, and other European gentlemen. As the mere mention of the Government or Government officers is in itself sufficient to inspire awe in the minds of the jungle folk, the sole object should be to endeavour to the utmost to

bring to success, without making oneself awesome to the people, the society which one has been "preaching" to bring into existence. In my humble opinion, if the department which a man has been endeavouring to promote does not thrive and prosper, the responsibility for this state of affairs must be his. There should be an intimate association and intercourse between the members of the societies and the departmental officers as between brothers and all should thus strive together for the speedy success of the societies.

(*ii*) When private individuals of a locality invest their money in the co-operative societies, interest should be paid to them once in six months at the rate of 1 per cent per mensem. The Registrars of the Co-operative Department should devise ways and means to prevent the loss to the investors of the money so entrusted to the societies.

(*b*) (*i*) Credit societies should be advised to give loans at the rate of Rs. 1-8-0 interest for a period not less than one year and in cases where the interest due and one-fourth of the principal are paid up, an extension of a further year should be given. The by-laws of the co-operative societies as passed by the general meeting should be confirmed by the authority of Government.

(*d*) The societies of which I have a personal knowledge have in a generality of cases achieved their object to a small extent.

U TUN AUNG, Chairman, Mudon Co-operative Society, Mudon, Amherst District.

Replies to the Questionnaire.

QUESTION 5.—FINANCE.—(*a*) More encouragement should be given to the co-operative system of granting loans.

(*b*) The *taccavi* system of giving advances (by the Government) should be employed only in the villages, localities or groups where co-operative societies cannot be formed. The granting and repayment of *taccavi* loans should not be left to the discretion of any individual officer, but the borrowers of each locality concerned, together with suitable elders and men of position in the locality, should be formed into a group or society and after fixing a limit to the borrowing credit of an individual member by the group with regard to his means and position, loan should be given to such a person of a sum of money adequate for the purpose of his actual need but not exceeding the limit so fixed, the longest term for repayment of the same being fixed and provision also being made for the exercise of an option to repay the loan if so desired within a shorter period, together with the principal and interest due on the date of such repayment. Such loans and repayments should also be entered up in the accounts of the individuals concerned, the officer responsible for the issue of duplicate and receipt signing in their accounts. I suggest that it is advisable to give the widest possible publicity to the *taccavi* system of granting loans by publishing particulars of the system in the Gazette and the Burmese newspapers and by distributing pamphlets and literature on the subject *gratis*.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—(*a*) (*i*) The main causes of borrowing are the want or inadequacy of funds for seed-grain and subsistence expenses, taking leases of paddy-lands for cultivation on payment of the rent in cash in advance in the case of some cultivators; and the want or inadequacy of funds for the preparation of the paddy-land, the weirs, canals, water-courses, *bunds* and embankments and for obtaining manures.

(*ii*) The sources of credit are the wealthy persons who live by moneylending, the landed proprietors who live by renting out paddy-lands and the co-operative credit societies from whom loans are usually taken.

(*iii*) The reasons preventing repayment are the inadequacy of the weirs, canals, *bunds* and embankments; the failure or destruction of crops due to pests and the high rates of interest charged on the loans taken.

(*b*) The measures necessary for lightening agriculture's burden of debt in my opinion are: inauguration by the Government of measures, either by legislation or otherwise, to restrict the execution of deeds or bonds stipulating for, and exacting payment of, excessive amounts of interest or profit either in the shape of monetary interest, interest in kind of paddy, or paddy to be paid at some future date, or affecting the borrowers very detrimentally; making this law known to the public as widely as possible and watching over and upholding the law by the Government department concerned; publication and distribution *gratis*, for the information of the general public, of pamphlets and literature acquainting them with the fact that if in any case creditors file suits and cause attachment to be made of property whether mortgaged or otherwise, the field huts, harrows, ploughs, plough machines, seed-grains and subsistence paddy of the cultivators as well as the cattle, carts and boats used by them in cultivation, are not liable to attachment; and issuing of instructions to the civil courts that can issue warrants of attachment not to do so in respect of such exempted articles.

QUESTION 22.—CO-OPERATION.—(*a*) (*i*) There is plenty of room for encouragement and assistance to be given by the Government in this respect. The present system obtaining, in Burma, of administration and control of the co-operative movement by a separate department established for that purpose is quite satisfactory. Of the officers already appointed to the Co-operative Department, all except the Registrars should be made to exercise control only in the capacities of lecturers, propagandists and instructors in co-operation, demonstrators on co-operative work, critics and reformers of defects in the co-operative work, and to act in friendly consultation with the non-official heads of the co-operative societies. Definite instructions in that direction should be promulgated by the Government to the quarter concerned in the form of circular orders; special care should be taken by the Government to see that no officers of the Co-operative Department who have been guilty of any act of discourtesy or incivility towards any of the non-official heads or leaders of the co-operative societies either by speech, writing or personal behaviour so as to dishearten or discourage them, are kept in the department any longer. At present in Burma some of the officers in departments other than the Co-operative Department are not aware of the fact that the co-operative societies belong to a department under the control of the Government and either an indifferent attitude is adopted towards the co-operative societies or their leaders or no attention or recognition whatsoever is paid to them. As this practically amounts to the weakening of the spirit of co-operation in the minds of various people, this state of affairs should not be allowed to prevail and due recognition and just support should be given by the officers of the various departments to the co-operative societies, their leaders and the officers of the Co-operative Department: as, for example, giving just and lawful support in such matters as the registration of a deed by a co-operative society, litigation between a society and any other individual, filing of a petition, giving evidence in a court of law in a just and lawful manner in connection with any matter relating to a society; giving just and lawful support to any leader of a co-operative credit society in any matter whatsoever to be undertaken concerning the officers of the Government, due regard and cognisance being given to the fact of his being a leader of the co-operative societies recognised by the Government; the giving of due recognition and weight by the various Government departments concerned to the evidence given by the officers of the Co-operative Department in matters connected with the societies, as the evidence of those conversant with the matters of co-operative societies. Strict injunctions in these matters should be issued by the Government to the various officers subordinate to it either by an act of law or an order duly formulated in that behalf.

(*ii*) Without the non-official element it is highly difficult for the Government alone to promote the growth of co-operative societies. As to the finding of non-officials, the mere giving of recognition and support by Government officers in various departments to people imbued with the spirit of co-operation would produce leaders in the co-operative movement. These leaders and the high Government officials should join together and form one big association consisting 75 per cent of non-officials and 25 per cent of officials acting in collaboration and having for its president a non-official, the expenses of the said supreme association being defrayed by a

subsidy granted by the Government. The servants of the supreme council should not be borne on the roll of Government servants. It should be within the competence of the said supreme council to deal with the following matters, *viz.*—

(*a*) In what respect Government assistance is required for the co-operative societies.

(*b*) In what respect the assistance of the non-officials is required.

(*c*) In what respect alteration is required in the control of the co-operative movement.

(*d*) In which kinds of work the increased activities of the co-operative societies are necessary.

(*e*) Which kind of work should be carried on wholly by the Government and which by the non-officials.

In all the above instances, the co-operation of non-officials with officials is necessary.

(*b*) (*i*) In credit societies loans should be permitted not only on short-term credit but also on long-term credit. For this purpose funds in the shape of money available on long-term investment will be necessary. For this, if the Government would in the first instance advance loans to reliable societies, these advances could be further augmented by the investment expected to be made locally with the help and support given in co-operative matters by the various departments of the Government. At present the officers of the Co-operative Department and the non-official leaders of the co-operative movement have to sing their own praises and this does not go far to inspire confidence and respect in the minds of others. The fact that the members of the co-operative societies do not get as long term and as full value for their credit in their loans as they do from the outside moneylenders and capitalists is an interfering factor and a drawback to the credit societies. According to the systems of making loans now established in Burma, only those who take small loans on short-term credit can enjoy the benefits of the credit societies. The idea of forming land mortgage societies (banks) specially for those who require large loans on long-term credit on the mortgage of lands has already been mooted, but it has not borne any fruit yet and the matter has been kept in abeyance by the Government up to now. However, even if the undertaking were crowned with success, it would in no way advance the position of the original co-operative societies and the Co-operative Department. Therefore, if the already existing co-operative societies are helped forward with loans advanced by the Government on long-term credit, the Government help can be withdrawn when, and as soon as, funds are available in the shape of investments made by local investors, the same being secured by the help and support of the officers of the various departments. If this suggestion were adopted, the credit societies already existing would grow and prosper. Further, I beg to suggest that instructions should be issued to the officers concerned to give facilities and assistance in any manner that may be necessary to the credit societies when they have occasion to file suits in any civil court in connection with monetary transactions, or to defend or contest any suits, due recognition being given to them as societies founded and established by and under the auspices of the Government, so that the least possible trouble or obstruction should be caused to them.

(*d*) The societies in Burma of which I have personal knowledge have, so far as I know, not yet achieved their object.

U BA MAUNG, Manager, The Pegu Central Co-operative Bank, Limited.

Replies to the Questionnaire.

QUESTION 2.—AGRICULTURAL EDUCATION.—(*ii*) There is no agricultural school in this Province with the exception of a missionary agricultural school in Pyinmana. It is quite essential to establish an agricultural school in every important agricultural district, *e.g.*, Pegu, Hanthawaddy, Insein, Toungoo, etc.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(*a*) The comparative yield test demonstrations of pure paddy with that of local paddy, carried out by the Agricultural Assistants in the districts, have helped to open the eyes of the cultivators to the great advantage they will derive by growing pure strain paddy. With the increase in produce and the better value they receive the cultivators have reaped a great benefit out of these demonstrations, with the result that the area under pure paddy increases annually in all districts.

(*b*) Field demonstrations can be carried on more effectively if the Agricultural Assistants in the districts are not restricted to a limited number of touring days. Moreover, there should be more than two Assistants in each district, in order to increase the effectiveness of field demonstrations.

(*c*) In order that the cultivators may be induced to adopt expert advice, it remains for the Agricultural Department to show convincing facts and figures to the cultivators by actual demonstrations. This means the need for more assistants in the district and also an unlimited number of touring days in the district.

QUESTION 5.—FINANCE.—(*a*) There is no better way of financing agricultural co-operation than through central co-operative banks. Each agricultural village should have a co-operative credit society; every villager or cultivator should become a member of that society and be allowed to enjoy the privileges of the society to the full extent. Then it will be necessary to finance every society adequately by the bank. No Central Bank in Burma can be expected to be in a position to finance such societies adequately. It is, therefore, for the Government to give long-term cheap loans at about five per cent per annum, as in the case of Denmark and other countries. The existing system of advancing Government money direct to the cultivators is not so popular as that of the co-operative credit system. If Government money is deposited in the Central Banks at the present rate of interest charged by the Government, ten per cent, not a single bank in Burma will accept it, because, hitherto, the rate of interest charged to the societies by the bank is only ten per cent per annum and thus there will be left no margin for the working expenses of the bank. It would be a great boon if Government would give loans at five per cent.

It is the ultimate aim of the central co-operative banks to lower the rate of interest on lending as much as possible.

If the Government means to make the co-operative movement stable in Burma, I cannot see any reason why the Government should not follow the example of other countries.

QUESTION 10.—FERTILISERS.—(*a*) The Agricultural Department, through their District Assistant, has carried out bonemeal manure demonstrations in the district and, though the cultivator speaks highly of it, he desists from applying this manure for the simple reason that it is expensive. Farmyard manure is the only inexpensive manure. It only remains to educate the cultivators how to collect and store their cattle dung and how to apply it to their fields.

QUESTION 11.—CROPS.—(*a*) (*iii*) In a district like Pegu, the distribution of seeds is retarded by absentee-landlordism. The cultivators are mostly tenants, and with the landlords taking no interest in their lands or their tenants, except to collect their rents once a year at harvest, the progress is not as rapid as it ought to be, were there a symbiotic relation between landowners and tenants.

QUESTION 14.—IMPLEMENTS.—(*a*) The *Theikpan* plough, an improvement on the indigenous plough, introduced by the Agricultural Department, is good enough for the purposes of the cultivators. It has even taken the place of tractors in certain localities, as it is found to be inexpensive, and saves labour and time.

(*b*) In order to hasten the adoption, by the cultivators, of improved implements, demonstration of these improved implements must be carried out as extensively as possible, pointing out to the cultivators the advantages; moreover, the improved implement thus demonstrated must be within the means of the poor cultivators. The District Agricultural Assistants have been carrying out *Theikpan* plough demonstrations in the districts, thereby convincing the cultivators as to the merit of the *Theikpan* plough.

U Ba Maung]

But this is not sufficient, it must be carried out extensively, but the touring of District Assistants at present is restricted owing to the deficit budget.

(*c*) For the ready sale of improved implements, trustworthy agents or *akyosoungs* can be selected at important centres, as has been done in the appointment of *akyosoungs* at all important centres of the district, for the sale on commission of *Theikpan* ploughs.

QUESTION 22.—CO-OPERATION.—(*a*) (*i*) The land mortgage banks should be one and the same as the existing central co-operative banks where long-term loan can be given to the cultivators. If this system be adopted, the existing co-operative societies will get better finance and will be placed on a sounder footing, while Government will save a large amount of expenditure in the cost of establishment, etc.

The present Government staff supervising the co-operative movement in Burma is inadequate and requires strengthening, as recommended by the Committee so that the staff may spend more time with co-operative societies than at present. The average number of societies to be dealt with by each Junior Assistant Registrar should be fixed at 100 and by each Assistant Registrar at 300.

In some districts where the demand for agricultural advances is heavy, Government should take special steps to organise co-operative societies and to lend Government money through such societies.

Training schools for co-operative education at suitable centres should be opened at the expense of Government.

To encourage industry, the industrial societies in Burma should be financed by the Government.

In opening out a large area of land for cultivation purposes, co-operative societies on the tenancy system should be formed and should be given leases.

(*ii*) Honorary organisers should be appointed to do propaganda work and help the Government staff where necessary. They should be under the control of the Registrar of Co-operative Societies, and their travelling expenses should be borne by the Government.

For the growth of the movement the chairmen of the unions and societies should be encouraged to do detailed supervision of the societies by recognising their services.

(*b*) (*i*) (1) Supervision by Government staff and non-official agencies is inadequate.

(2) Lack of sense of responsibility.

(3) Irresponsibility in granting loans.

(4) Poor repayment for want of an agency for making timely collections.

(5) Following bad example of a defaulter.

(6) Want of business knowledge.

(7) Unforeseen heavy expenses in litigation.

(*ii*) Purchase societies or stores were tried in several places, but proved to be a failure owing to want of business knowledge, want of loyalty among members, competition by non-Burman shopkeepers and difficulty of recovery of value of goods. However, such a society among the police officers and men in Pegu district is successful.

(*iii*) This class of society has been tried in several places, but proved to be a total failure for want of—

(*a*) Capital,

(*b*) Business knowledge and

(*c*) Management.

Note.—Mr. Dunn proposed a scheme to build granaries for the societies out of rice control profit, but his proposal was turned down by the Government.

(*iv*) Societies for effective improvement should be tried in the areas where there are fisheries and canals, to protect the interest of cultivators.

There is a constant conflict of interest between cultivators and fishery lessees but preference should be given to the predominating interest in the locality concerned.

(*v*) No such societies exist in Burma.

(*vi*) Societies for the co-operative use of agricultural machinery would be very advantageous to the agricultural societies, but this district has none.

(*vii*) Societies for joint farming are not in existence in this district. This class of society should be introduced in the area where credit co-operation is successful.

(*viii*) No attempt has ever been made to form such societies in this district.

(*ix*) There are no societies for any purpose connected with agriculture or the betterment of village life except those already mentioned but I think it is desirable to form labour societies to take contract work from the district local bodies, railways, and the Public Works Department.

U BA MAUNG, Mr. ROMEZ, U BA MAUNG and U TUN AUNG*, Representative Co-operators from Lower Burma.

Oral Evidence (through an interpreter).

62817. *The Chairman:* U Ba Maung, you are Chairman of the Einme Township Bank?—Yes.

62818. And you, Sir, whose name is also U Ba Maung, are Manager of the District Central Co-operative Bank, Pegu?—Yes.

62819. Mr. Romez, what exactly is your connection with the co-operative movement?—I am Manager of one of the tenant co-partnership societies.

62820. Now, Gentlemen, I think the best way to proceed would be that one of you should answer for the rest, but there is no reason why, if any one of you disagrees with what the speaker is saying, he should not say so; I hope he will; and of course if anybody wishes to interpolate any remarks, let him do so. But it will be easier for us if we may address ourselves, so far as our questions go, to one particular witness. Perhaps you would arrange that amongst yourselves. It has been given in evidence before this Commission that co-operation as a whole in Burma is in a disappointing condition to-day; do you agree with that?—(*U Ba Maung, Chairman, Einme Township Bank*) Yes.

62821. Will you give the Commission your views as to why that is so?—The point is that in former days there was official control, say, up to the year 1920. But the Government, instead of increasing the staff, handed it over to non-official control. That has not been successful because these people have not been able to find time to do the work. There is also lack of finance.

62822. The removal of official surveillance is an ideal, but you think it was attempted too early; is that the point?—Yes, too early.

62823. Do you other gentlemen agree with that?—(*Mr. Romez*) Yes.

62824. I shall assume you agree unless you express dissent. Is it your view that the educative side of the movement was sufficiently appreciated and developed? By that I mean to say, do you think the members of primary societies understood what co-operation meant and were able to take their fair share and part in conducting the affairs of their society?—(*U Ba Maung, Chairman, Einme Township Bank*) Yes, most of the members, especially, if I may say so, in Lower Burma, have done very well. The only thing is that when there is any flood or drought such as occur in some parts of that district, and when there is lack of supervision of loans, most of the societies go into liquidation; but some of the societies are prospering and they have a reserve fund of over Rs. 15,000, that is, societies which have been existing for more than ten years.

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* U Tun Aung joined the other witnesses during the course of the evidence.

62825. It has been given in evidence before the Commission that the financial difficulties into which primary societies fell were due to the effect upon their members of a number of bad seasons in sequence, that is to say, their crops were unsatisfactory for a number of years in sequence. How far do you think that is so, that that was responsible?—No doubt the societies have been suffering on account of flood, but I wish to see that remedied. It can be remedied if the Central Bank can give them a long-term loan which can be recouped after a number of years.

62826. You mean, give the societies a long-term loan?—A long-term loan.

62827. How do you suggest the societies should employ the credit so afforded?—At present the Central Bank cannot afford to give long-term loans because its deposits received from the public are for four years at the most, but if the Government come in with State aid and lend money through the Central Bank, the Central Bank may be able to finance these societies for a number of years.

62828. You are suggesting that long-term loans should be used by the societies in making advances on a long-term basis to their members?—Yes.

62829. Would you regard it as very important that the affairs of every member applying for a long-term loan should be most carefully examined and his reputation most carefully assessed, in order to discover whether he is the type of man who would wish to repay if he could?—Yes.

62830. Do you agree that any too lavish distribution of long-term money, without a sufficient examination of the fitness of each applicant, might lead to the necessity for foreclosing and to disaster?—No, because in that case there should be adequate supervision by officials before dispensing the long-term loans.

62831. Do you agree that adequate supervision is essential?—Yes.

62832. If it became necessary to foreclose right and left, then, whether it was a land mortgage bank or the co-operative movement, there would be grave disturbance of public confidence?—Yes.

62833. Have you attended a considerable number of annual meetings of primary societies?—Yes, including a course of inspection of these societies.

62834. Is their business conducted as it should be?—Yes, in most of the societies, not all.

62835. I think your average number of members per society is about twenty-two?—In the Pegu district, the average is about fifty.

62836. As many as fifty in that district?—Yes.

62837. That is the district with which you are familiar?—Yes.

62838. Out of those fifty members in your district, how many as a rule attend the annual meeting?—About three or four of the number of members attend the annual meeting.

62839. Is that a healthy sign?—That is a healthy sign.

62840. Why?—Because sometimes we hold the meeting when the members are very busy on their lands and some of the members are out in their paddy fields.

62841. Do you mean they are so busy that they cannot get to the annual meeting, at which the affairs of their own society are to be discussed, once each year?—I beg your pardon, I mean only the annual meeting of the bank.

62842. No, I am thinking of the annual meeting of the primary society?—On the average, about ninety per cent attend the meetings of the primary societies because the meetings are held in the same village. Very few people attend the union meetings, the distance being six or eight miles.

62843. *Dr. Hyder:* Did you say ninety per cent of the members attend the meeting?—Yes, about ninety per cent of the members attend the primary society meeting.

62844. Would you agree with this statement; I am quoting from the debates of the local Legislative Council: "The general membership of the Council remained stationary throughout the year. Two general meetings

were held where twenty-nine representatives were present at the first meeting and twenty-four at the second meeting, which is thirty-seven per cent and thirty-one per cent of the total membership respectively."

62845. *The Chairman :* Is that a primary society? That is the bank, is it not?—That is the Provincial Bank; and I can explain this further. Those ninety per cent may attend only in the good societies but not in the bad societies, because when there is some default they may not like to attend the meeting.

62846. I think the rate of interest charged to members of rural credit societies is fifteen per cent?—On loans from the society to the members the rate is fifteen per cent; from the bank the rate is ten per cent.

62847. What does the indigenous moneylender charge?. Should I be right if I said his charges run from twenty-four per cent to sixty per cent?—Yes.

62848. That is approximately correct?—That is approximately correct. There is a special rate charged when the money market is very tight, during the transplanting season; they call it *saba-pe;* that rate is about a hundred per cent.

62849. Having regard to the fact that so many societies have had difficulty in maintaining a healthy financial condition in face of their risks when they were lending money at fifteen per cent, is it your view that a higher rate of interest to be charged by the primary society to the member borrowing would be advisable?—No, because if we look at the working expenses of their land, fifteen per cent is just low enough to enable them to save enough from their income to pay interest and instalments on loans to the societies.

62850. That is from the borrower's point of view?—Yes. Then when any misfortune happens, such as flood or failure of crops, it is very hard for them to pay that fifteen per cent interest to their society and they are unable to pay more than about one-fourth of their instalments.

62851. If you find that it is impossible to conduct lending operations of primary societies on the basis of fifteen per cent, might it not be worth while at any rate experimenting with a slightly higher rate of interest in order to secure financial stability?—You mean charged to the members?

62852. Yes?—How will that be possible?

62853. You do not think they will pay?—Yes.

62854. I am as anxious as you are to provide money as cheaply as possible but as a practical man I know that if business cannot be financed at fifteen per cent it is no use saying that it can be. That is the point?—My view is just to reduce the rate of interest charged by the primary society to its members and by the Central Bank to the society.

62855. How are you going to finance these operations?—According to the condition of the money market. Some of the Central Banks have been paying nine per cent interest to the depositors and some have even been paying nine-and-a-half per cent.

62856. Nine and-a-half per cent to the depositors?—Yes, and lent out to the societies at ten per cent.

62857. On one-half per cent margin?—Yes.

62858. I take it, then, that your scheme is to work down to a lower rate of interest to your depositors?—My idea is that the rate of interest should be lowered.

62859. How do you propose to reconcile your natural desire to get money as cheaply as possible with the instinctive tendencies of human nature? If your public will not come forward at seven-and-a-half per cent, how are you going to get the money?—The joint stock banks are receiving deposits at a very low rate of interest. It is two per cent above the bank rate and sometimes three per cent.

62860. Do you mean to say that the banks are paying three per cent to depositors?—Three to five per cent above the bank rate.

62861. What exactly is the security on which these depositors are standing? Is it not the security of the joint stock banks?—It is the security of the joint stock banks.

62862. You told the Commission that your public would not come forward at seven-and-a-half per cent and yet the public goes to the joint stock bank at three-and-a-half per cent above bank rate. The public is making a mistake. Is that so?—It may be the fault of the Government in not looking after the co-operative institutions properly and trying to get the confidence of the people.

62863. Do you wish to suggest that Government should provide all the long-term capital required by the co-operative movement?—Yes.

62864. Do you distinguish in that suggestion between Government and the tax-payer or do you think they are the same thing? Your suggestion is that the general tax-payers should subsidise the co-operative movement by meeting the difference between the rate at which the public is prepared to lend money and the rate at which Government should lend the money? —Yes.

62865. Would you agree that a sound policy for the co-operative movement in Burma would be to concentrate on restoring the credit movement before embarking on any experiments in the way of selling societies?—Yes.

62866. The credit movement should be put into order first?—Yes.

62867. Your societies have been helpful in the matter of distributing seeds?—Yes.

62868. Are you satisfied with the quality of the seeds received from Government stations?—Yes. The Government are improving the agricultural farms in most of the districts.

62869. Do you think there will be any opening for co-operative societies devoted to adult education?—Yes.

62870. Would you run your libraries in conjunction with adult education. Would you establish your libraries in villages where adult education has taken hold?—Yes.

62871. What are your views as to what should be done in the matter of veterinary dispensaries?—I cannot say anything on that.

62872. Do you think that the experiences in the years that have intervened since the co-operative movement was started have damaged, to any serious extent, the reputation of co-operation amongst the cultivators as a whole?—Certainly not.

62873. The damage is not incapable of being repaired?—No.

62874. *Sir Thomas Middleton:* You told us that you had fixed the rate of fifteen per cent because you were satisfied that the Burman cultivator could not pay more than fifteen per cent. Suppose there is no co-operative society and the cultivator goes to the *chetty*, what has he to give?—Two per cent per mensem, that is twenty-four per cent.

62875. For how long a time does the *chetty* give credit on those terms? —It is only a seasonal loan.

62876. One season?—Yes.

62877. How many months?—About eight months.

62878. Does the *chetty* ever give credit for two or three years?—Yes, sometimes, in cases where the lands are mortgaged. Otherwise the loan will be accumulating for landless agriculturists.

62879. Supposing there is a crop failure and the *chetty* sees that the man cannot pay, what happens?—He will have to extend the loan. If the man has landed property, the *chetty* sues him in court to get that land.

62880. A man who is unable to pay you fifteen per cent pays twenty-four per cent to the *chetty* and gets what he requires?—Yes. If he is a small agriculturist his land is taken by the moneylender in the course of a few years.

62881. That, you agree, is bad?—Yes.

62882. Your object is to lend at as low a rate of interest as possible?—Yes.

62883. Now, however careful you are in selecting borrowers and however honest these borrowers may be, if there is a failure of the crop, the honest man cannot pay up?—Quite so.

62884. Therefore you must have a reserve fund, which will serve as an insurance fund. How are you going to get that for your societies? You must have something to provide against bad years and bad seasons?—In the good years, when they have sufficient income, they usually buy some jewellery and things like that and they accumulate this as a sort of reserve fund for the bad years. This reserve is sold or mortgaged to the *chetties* or the local moneylenders, as the necessity arises. That is the general practice done in the villages.

62885. Are these difficulties that you referred to not due to the fact that the sources on which your reserve fund depend are too limited. All the jewellery and credit that your members had to pledge were not enough for the purpose?—Yes.

62886. I can see no way of increasing the reserve except by increasing, somewhat, the rate of interest until you have built up a reserve fund which will enable you to tide over the bad seasons; and it seems to me that between fifteen per cent which you charge and twenty-four per cent which the *chetty* charges, there is a margin on which you might work?—Yes.

62887. *Mr. Calvert:* In Burma, is much of the rural debt ancestral, that is, inherited from fathers and grandfathers?—Yes.

62888. Has the debt among the cultivating classes increased as the value of land has risen?—Yes.

62889. Is it regarded by the Burman cultivator as a disgrace to be in debt?—They are not ashamed of being heavily in debt.

62890. Are the cultivating classes with whom you are familiar really prepared to sacrifice their comforts in order to pay off their debts year by year?—Yes, most of them are quite willing to sacrifice their comforts.

62891. To make a real effort to pay off their debts, say, by fifteen years?—(*Mr. Romez*) It would not take so long as that. It would take less time. They are not very heavily in debt, and I should think that it would take them about ten years to pay off their debt if they could get a long-term instalment loan.

62892. Is it general, then, that when a man has been a member of a co-operative society for ten years he has paid off his debts?—(*U Ba Maung, Chairman, Einme Township Bank*) No, they will have increased their assets by that time.

62893. Is it capable of demonstration that, in a society of ten years of age and more, the general position of the members is markedly better than it was before?—(*Mr. Romez*) Certainly when they got their land from Government it was worth about fifty rupees an acre, but now it would be worth about two hundred or three hundred rupees, and, in addition to that, they have been able to build their own tanks and other things. If all that is going to be taken into consideration, then the cultivator would, I think, have no debt at all. I myself have found that most of them are in debt to, say, an extent of Rs. 2,000 or Rs. 3,000 whereas their land and assets are worth much more than that.

62894. In your best co-operative areas, can you say with confidence that in the last ten years the number of moneylenders has decreased?—(*U Ba Maung, Chairman, Einme Township Bank*) The number of moneylenders has not decreased, but the rate of interest has.

62895. Could you take me to a tract of, say, fifty villages and say that there is not a single moneylender left in those villages and that all have been driven away by co-operation?—Yes; but it may be due not only to co-operation but also to the outsider as well. The rate of interest on money lent to the co-operators has certainly been reduced, because outsiders have come into the villages, and then again there are the co-operative societies.

62896. In your better societies, have the members completely ceased dealing with moneylenders?—No, they still deal with moneylenders in most cases. As a matter of fact, members of even the best co-operative society have been dealing with moneylenders.

62897. The next census is due in 1931. Can you confidently say that the next census will show a definite decrease in the number of moneylenders in Lower Burma?—(*Mr. Romez*) Yes, I think so. If Government would only see its way to help these cultivators to refrain from borrowing money

from outside, it is my belief that, in a very short time, they would do without the moneylender altogether.

62898. Do you find that the members of your primary societies understand unlimited liability?—(*U Ba Maung, Chairman, Einme Township Bank*) Yes, they do understand it.

62899. Does that prove of any assistance in liquidation?—Yes, it does, but up to date no unlimited liability has been enforced here.

62900. Does the fact that the members are liable, without limit, for each other's debts make them help the liquidator in recovering from the indebted members?—Yes.

62901. In your Central Bank, who owns the majority of the shares, individuals or societies?—Societies.

62902. What does your directorate consist of?—Of individuals as well as of all the chairmen of unions.

62903. And how many representatives of societies?—Every union chairman is a director of the Central Bank. According to the by-laws there must be, altogether, eight individual share-holders as directors of the bank.

62904. That is to say, the majority are actual co-operators?—Yes.

62905. What limit is there to the dividends payable by the Central Banks?—Eight per cent.

62906. Does your Central Bank exercise any control over the internal working of primary societies?—No.

62907. Do you send any one to inspect them?—We started doing so only during the last season.

62908. What means have you for getting information as to the financial position of a society?—We look over the assets of the societies and see whether supervision over the loan is properly made or not.

62909. How can you, in your Central Bank, find out the condition of a borrowing society miles away?—From the report of the Junior Assistant Registrars and Auditors.

62910. What, exactly, is your procedure for dealing with an application for a loan?—The society applies through the union. Every year the bank fixes the cash credit of each society. In the first place the society proposes a cash credit and the union approves it, after which it goes up to the Central Bank, who formally fix it for the year in a meeting with the union chairman.

62911. Is any delay involved in dealing with an application?—There is no delay involved.

62912. Is any difficulty encountered by a society which is trying to repay its loan to the Central Bank?—Yes, sometimes.

62913. Assume, for a moment, that a society has a couple of hundred rupees left in hand and wants to send that to you in repayment of its loan?—Sometimes the societies send the money by money order, sometimes through the Treasury and sometimes their own men are sent personally to make the payment.

62914. In your district, are the communications bad to the extent that they restrain the society from repaying your loan? Is the trouble in going to your Central Bank so great as to prevent their coming to you for repayment?—Yes, that is so in some parts only of the district. In the northern part of the district distances of twenty miles have to be traversed along a cart-track in order to reach the Central Bank.

62915. You have got, in your district, societies which have been steadily accumulating share capital and reserve for a number of years?—Yes.

62916. Are any of these societies now independent of the Central Bank?—Not yet.

62917. As these societies are collecting their share capital and accumulating reserves, are they reducing the rate of interest to their members?—No; not yet.

62918. You mentioned to the Chairman, at the beginning, that one reason for the decline in the condition of co-operative societies was the policy of handing them over to non-official control. There are two kinds

of non-official control; one is the control of the actual members themselves, where the actual honorary workers are themselves friends and relatives of the people they are helping; and the second type of non-official control is of gentlemen from the towns who wish to show their public spirit by helping people whom they regard as poor and down-trodden. Which kind of non-official control were you thinking of when you used that phrase in answer to the Chairman?—Both; the relatives and the men from the town. There are not enough members in the societies with sufficient knowledge of co-operation to manage the societies, and the philanthropic persons who come to the help of the societies have not the time; so that both are lacking.

62919. With regard to the inefficiency of the non-official system, is that due to the fact that we are looking for too much from busy men or that the men who are helping are not fully qualified? You may have a man fully willing to help his brethren but who is lacking in education, or you may have a man who is perfectly competent to help them but who cannot spare the time (he may be a busy lawyer); which people are you thinking of?—People who are well educated but cannot find time.

62920. As regards this co-partnership system, who owns the land?—(*Mr. Romez*) Government owns the land.

62921. Does the society acquire permanent rights in the land?—No; we do not acquire any ownership in the land; we get it on twenty years' lease; after twenty years the lease expires.

62922. The society holds the lease?—Yes.

62923. The individual members do not acquire any right in the land at all?—They do not.

62924. Who allots the land between the members?—The chairman and the members of the committee.

62925. When a tenant dies, the allotment of the land is arranged by the committee?—Yes.

62926. What is the initial cost of clearing?—The cost of clearing is from fifteen to twenty rupees per acre at the present rate, but the cost of reclaiming the land would be about a hundred rupees.

62927. How was that first expenditure met?—We received loans from the Government; but, as I said, we did not get a sufficient amount, and therefore the people had to borrow outside. The moneylender saw that it was a good opportunity for him, and people had to pay about thirty-six to forty per cent interest, or eight annas per basket, which with the price of paddy at ninety-eight rupees per hundred baskets, worked out to fifty per cent, and so they got heavily indebted.

62928. When the Government advanced money, did they advance money to the society as a body, or individually to the members?—It advanced to the society as body, and individual members received loans after supervision from the chairman.

62929. How long has your society been in existence now?—Thirteen years.

62930. Would you say that the society has been a success?—It has been a sure success; there is no doubt about that. If you saw the standard of living of the people there, the houses built by them, and so on, you would see that they have achieved quite a reasonable standard.

62931. If you were advising us on a proposal to start similar societies, say, in the Punjab or Sind, what changes would you make in your society, with your present experience?—I believe the first system was quite sufficient. After Mr. Graham, the officers who came out did not know the people and did not realise their difficulties. They could not drain the land properly for want of capital and their cattle died of cattle disease. I have known of very few instances of people with money going into liquidation. They could not work properly because there was no money. Otherwise, the society is a success.

62932. In other words your advice is that sympathetic officers should be in charge and Government should not spoil the scheme by giving too small amounts of money?—Certainly, that is what I want to say.

62933. *Dr. Hyder* : Mr. Romez, you are replying to questions relating to colonisation societies formed on co-operative lines; how many such

societies are working in Burma at present? We have got about eighty-two societies.

62934. Do the members mortgage the land to moneylenders?—They cannot, because they do not own the land.

62935. Is that prohibited by law?—Yes.

62936. You are speaking now about societies formed for colonisation?—Yes.

62937. Are you sure that the members cannot mortgage their land?—They cannot, because under the instrument of lease they cannot mortgage the land.

62938. Are you acquainted with the affairs of a society called the Yitkangyi Colony? Do you know that the members, as soon as the colonisation officer left the area, proceeded to *chettyars* and Burman moneylenders and mortgaged, each member, forty-five acres?—No; I have not heard about it.

62939. Is the Agricultural Department satisfied with the agricultural improvements which these societies bring about?—Yes; I believe so.

62940. Have you ever been to the Hmawbi Farm?—I have not been; but we have got a farm at Kadonbaw, where we are planting different kinds of seeds of paddy.

62941. Are you satisfied with the audit system and your auditors? Do your auditors work well?—(*U Ba Maung, Chairman, Einme Township Bank*) Some auditors are good; some are not satisfactory.

62942. When they mismanage the affairs of your society or cheat the society, does the society institute prosecution against them?—Yes.

62943. Who bears the cost of audit at present?—The society.

62944. Would you like the society to continue to bear that cost?—No; we are asking the Government to pay the cost of audit fees.

62945. You would like the Government to bear the cost of such audit?—Yes.

62946. Why?—Because the societies themselves have not sufficient surplus. Most of their profits go towards the expenses of audit, supervision fees and travelling allowance for the chairman to go to the district association meetings. A society which has a working capital of Rs. 3,000 cannot show any profit at the end of year after meeting these expenses.

62947. I quite see that you are anxious that the society should have a surplus; you are anxious to build up a reserve; but does it not occur to you that you wish to build up this reserve at the expense of somebody else, that is, the Burman tax-payer?—The fund is not sufficient; therefore we must ask Government to help us by bearing the cost of audit.

62948. You want your society to be run on business lines, do you not?—Yes.

62949. Does not a business concern pay for its audit?—Small societies which are just started do not find it possible to build up reserves, and therefore they want to follow the old precedent. Formerly Government paid the cost of these fees and the old societies built up big reserve funds. The new societies want to follow the old precedent.

62950. With regard to the seeds distributed by the Agricultural Department or the co-operative societies, do you know of cases where the cultivators, instead of sowing the seed sent to them, eat it up and return red rice to the distributing agent?—No.

62951. What is this evil practice of irrigation *bund* construction? What have you got to say about it?—There is no outlet for the water from higher areas to flow down, and the paddy land just above the *bund* is adversely affected; the water becomes stagnant by the building of the *bund*.

62952. If you let that water flow over the land of somebody else, you would be swamping his crop?—No; it would flow away gradually through the neighbouring lands. I am referring to cases where the *bunds* are built very high, so high that the water is not allowed to flow downwards.

62953. Suppose you wish to alter an existing *bund*, or construct another *bund*, or remove an existing *bund*, do you have to submit any plan to the Revenue Department, and would you incur any expense?—No plan has to

be submitted; only a report has to be made to the authorities concerned. There would be no cost.

62954. *Mr. Reynolds:* You do not wish to raise the rate of interest at which the primary society lends to members. It is about fifteen per cent, and you do not want to raise that?—(*U Ba Maung, Chairman, Einme Township Bank*) That is so.

62955. You say, in your part of the world a member of a primary society can borrow at two per cent per mensem from a *chetty*?—Yes.

62956. That would be with very good security?—Yes, when they can give a mortgage.

62957. If the security was not very good, it would be two-and-a-half to three per cent per mensem?—Quite so.

62958. I think you said that a good many members of the primary societies in your area had loans from *chetties* and other moneylenders, as well as from the society?—Yes.

62959. Do you think that most of them have a seasonal loan from the *chetty* as well as from the society?—In a good society, they take more loans from the society than from outsiders.

62960. Are there some societies where there are as many loans from *chetties* as from societies?—There are some societies of that sort.

62961. And they borrow at from twenty-four to thirty-six per cent?—Yes.

62962. You have had experience about the repayments of loans by primary societies. Have you found a reluctance to repay the society loan borrowed at fifteen per cent, until they have entirely cleared off the money-lenders' loans at twenty-four to thirty-six per cent? Have you found that they delay repaying the society until they have paid off the money-lender?—In some of the societies it was so, but in most of the societies they pay their bank loans first and then repay the outside loans, when they receive their loans from the society a second time.

62963. I ask, because I have seen it stated that in Upper Burma they concentrate on repaying the more expensive loans, and then pay the cheaper society loans?—In Lower Burma, too, some of the societies are like that.

62964. *Sir James MacKenna:* Mr. Romez, has the Pegu Kayan Railway been constructed yet?—Yes.

62965. Is it open?—Yes.

62966. Is it of much use to the colony?—It is not of much use to the colony, because it is very wide of the colony altogether.

62967. U Ba Maung, what is the capital of the Einme Township Bank?—It is a little over Rs. 3,000.

62968. Where do they get the money from?—It is in the form of shares.

62969. How many societies are members of the bank?—Four or five societies.

62970. How many societies are members of the union?—Seven societies.

62971. How old is this union? When was it started?—It was established about nine years ago.

62972. Does the union do the inspection or audit of the societies?—Yes.

62973. Do they do the audit of the accounts of the society?—Yes.

62974. *Professor Gangulee:* Mr. Romez, do you find any difference in the quality of farming between the colonists and the ordinary cultivators?—No, I do not.

62975. You see no improvement whatsoever?—No, except in the treatment of the land.

62976. Do you find any difference in the farming operations amongst the colonists as compared with the ordinary cultivators? The colonists are beginning with a clean slate, and the Department of Agriculture has introduced some improvements. I want to know from you whether the colonists have introduced any modern methods of farming?—Not in the

colonised land. Most of it is inundated by water in the rainy season. It is just the same outside the colony. We are not making use of any tractors, or other machinery.

62977. What assistance do these colonists get from the Department of Agriculture?—They get assistance as far as the seed is concerned.

62978. All your colonists use improved varieties of rice seed?—Most of them understand what it is to have good seed. Some of them are getting seed from outside and some are getting seed from the Agricultural Department. Some of them buy even now, but most of them have enough seed now in their hands to carry on. They do not care to change the variety again and again.

62979. Has any effort been made to educate these colonists in methods of better farming?—No, I do not think any attempt has been made in that way. They have only got one man on the staff that I know, and I have not seen him for the last two or three years.

62980. *Mr. Kamat:* You were asked why the co-operative movement was not flourishing in Burma and I think you gave, as one of the reasons, that the Co-operative Department removed their supervision rather prematurely. I want to get some further light on this question so as to make it perfectly clear. Before you answer let me state the case. If the movement has not been going on well, the fault must be, I take it, either with the officers of the department or with the non-officials, or with both. I want to know exactly what has occurred in this Province. You say supervision was removed; at what stage did that happen? Was it before the people understood the principles of co-operation and were able to take care of themselves?—(*U Ba Maung, Chairman, Einme Township Bank*) Before the people understood the principles of co-operation.

62981. The officials of the department threw the whole burden on the non-officials?—Yes.

62982. It has been stated against the non-officials that during the non-co-operation movement they changed their minds and did not care to help the movement; is that the case?—No, I do not think so; they were still of the same opinion.

62983. But is it not probable that the officers of the department naturally became disgusted with the attitude of the non-officials during the non-co-operation movement, and that during that time the removal of supervision occurred?—No, I think before that; the removal of officials was before the non-co-operation movement started.

62984. How many honorary organisers are there in this Province?—I do not know.

62985. I mean, was an attempt made to have, as far as possible, honorary organisers for each district?—No, because there are hardly any honorary organisers in our district.

62986. Is there any system in this Province of training non-officials to manage societies, having training classes?—Yes, the department asked the district agricultural associations and the Burma provincial councils to have training classes for secretaries of the societies.

62987. By whom is it done?—By the district co-operative agricultural associations and the provincial council.

62988. Is that official or non-official?—A non-official body.

62989. It has been stated by another witness that probably in certain cases discourtesy was shown by the officers of the Co-operative Department to the non-officials; is there any foundation for such a statement?—I do not think so, as far as rural co-operation is concerned; we do not know what happens in urban areas because we are entirely confined to rural co-operation.

62990. Broadly speaking, what are the relations between the officers of the Co-operative Department and the non-officials? Are they very cordial and friendly in their attitude so that the two work together in the most friendly manner in the villages, or are they purely official and stand-offish?—They are purely official but in my opinion the official acts as guide, philosopher and friend to the society.

62991. Therefore you think there is no truth in the suggestion that there is lack of friendliness and that there is discourtesy?—As far as rural co-operation is concerned, there is no truth in that statement.

62992. As regards the present state of things, it has also been said that the general mentality of the Burman is that he has no sense of thrift or economy; has that something to do with the fact that co-operative societies do not prosper here?—Partly.

62993. You were asked if the Burmans are not ashamed to be in debt from generation to generation. I was not quite sure whether you followed the question when you gave the answer; will you please repeat the answer?—We are of opinion that they are not ashamed.

62994. That is to say, that is not regarded as a matter for shame?—No, because it is considered to be a matter of business.

62995. They regard their debts as being something like the National Debt?—No, not exactly like that. They are ashamed if they think they will not be able to pay off the debt, but if the debt has been incurred for business purposes, they feel they can gradually clear it off and increase their assets; that is the idea.

62996. Between the officers of your department and the non-official workers in the villages, for rural co-operative work is there an intermediate stage of non-officials who may be called philanthropic workers or public-spirited citizens, living in towns and giving a portion of their time to the co-operative movement? Have you such men in Rangoon, Mandalay and such places, who devote their spare time to helping the villagers?—Yes, there are some such people but not many.

62997. That is to say, in places like Rangoon, Mandalay and such big towns?—Yes. There are some people residing in the big towns who help.

62998. Men who study the movement, interpret it, and help both the officials and the village people?—Yes, there are; they are members of the district co-operative agricultural society which is an unofficial association.

62999. Was their assistance made use of at the time when this official supervision was removed?—Yes, their services were available.

63000. Their services were available at the time when this official control was removed?—Yes.

63001. When the burden was transferred to the shoulders of these urban people, these public-spirited men, did they discharge that responsibility?—Yes, they did, but they could not afford much time to give to the work.

63002. They could not afford as much time as was necessary?—Yes, that is what I mean.

63003. *U Ba Cho:* Will you tell the Commission the sources of the deposits?—The sources of the deposits are mainly through the public, but, as I have explained to you, at the rate fixed by the bank.

63004. From the Burman public?—Yes; but we have another source available; we should get money at a reduced and very cheap rate of interest from the local bodies. The Government have passed an Act, No. III of 1923, by which local bodies can deposit all their money in Co-operative Central Banks approved by the Local Government; but though that Act was passed in 1923 we have not received any such deposits, although the representatives of these local bodies desire to deposit their money in the co-operative banks.

63005. Do you mean to say that, so far, the local bodies have not deposited their surplus money in your bank?—Yes.

63006. Why not?—The reason is best known to the Government; they refuse to sanction these deposits.

63007. You mean to say these local bodies desire to deposit the money with the Central Banks?—Yes.

63008. But they have not obtained the necessary sanction from the authority concerned?—Yes.

63009. But have they approached the authorities for the necessary sanction?—Yes, we have approached them.

63010. Not you, I mean the local bodies?—The local bodies have approached them but the Local Government have refused to give sanction.

63011. From the trend of your evidence I gather that you want State aid to be given to the co-operative societies and banks; is that so?—Yes.

63012. What are your reasons?—When we get State aid the people and the outside depositor will have confidence in the bank and we shall be able to get these deposits on a lower rate of interest; then we can equally reduce the rate of interest at which we lend to the societies; we shall also be able to attract all the agriculturists in the district to become members of the society.

63013. Do I understand that you feel that State aid or a loan from the Government will increase the prestige of your bank?—Yes.

63014. And other people will follow the example of Government and will deposit their own money with the Central Bank; is that the idea?—That is the idea.

63015. You are fully aware that the ultimate object of the co-operative societies or banks is to work out their own salvation?—Yes, but not at the present moment.

63016. I think you make it pretty clear that you think the control and supervision of Government is still needed at the present moment?—Yes.

63017. You have some experience of the colonisation scheme in Burma?—(*Mr. Romez*) Yes, I have had some experience.

63018. You know that, quite recently, the lands held by the colonists have been converted into Government estates?—Yes.

63019. The consequence is that under this scheme the cultivator can never become the owner or even the holder of land?—No, he cannot.

63020. You were talking of large areas of land in your locality being subjected to flood or inundation?—Yes.

63021. Do you not think that by draining the water these areas could be made profitable for cultivation?—I think money would have to be spent on digging out canals to take the water out and then the land would be very profitable to the cultivator.

63022. *The Raja of Parlakimedi:* Do you interest yourself in village sanitation?—We have got some rules from the Government and we do as much as we can. But it is not so advanced as in the towns.

63023. Are you taking an interest in the distribution of quinine?—We have no distribution of quinine.

63024. You are not taking any interest in this?—I am not. It would be a good thing to have travelling dispensaries if we could get them. In the rainy season people are liable to get sick at any time. The most prevalent diseases are fever and dysentery.

63025. In what way are you trying to help the people?—I am myself distributing medicine to the villagers there.

63026. Do you do this personally or through the co-operative societies?—There is no co-operative movement at present.

63027. The co-operative societies are not interesting themselves in this direction?—Not very much.

63028. Why not?—That I do not know.

63029. U Ba Maung, you will probably be able to tell us the reason?—Nobody has encouraged it. It requires encouragement to start it.

63030. I do not think you need anybody to encourage you in this matter?—It is the work of the district councils. I do not think it is the duty of the co-operative movement.

63031. Does not the death-rate among the populace make its appeal to you? A lot of people die from malaria and other diseases?—No doubt it makes its appeal to us but the co-operators do not think that it is part of their work. No doubt some co-operators who are members of the district councils devote their time to helping the villagers.

63032. Do you not think you should take a personal interest and talk to the members of the society when you go round and visit them?—We do speak to the members of the district councils and circle boards.

63033. Do you not think that you should try to improve sanitation in the village and make the best use of the dispensaries?—Burmans are now making greater use of hospitals. They have come to realise that it is a thing which should be managed by the people themselves.

63034. They are convinced also of the effects of quinine against malaria?—Yes, also of inoculation.

63035. *Mr. Calvert:* I understand that you, U Ba Maung, are the honorary organiser of the Township Bank. Would you tell the Commission how you were entertained as an organiser?—One Mr. Furnivall was Deputy Commissioner of Myaungmya. He selected me as a proper person to act as organiser and he appointed me as such. Since then I have been an organiser of societies.

63036. Were you originally a member of a primary society?—Not before that. It was only after I became an organiser that I became a member of a primary society.

63037. What is your profession?—I am a trader.

63038. Have you personally benefited from the co-operative movement as a member of the society?—I am not taking any loans or benefiting in any way. I became a member simply to help the societies onwards in their work.

63039. *The Chairman:* When was official control and help removed from the co-operative societies? Can you point to any particular year?—I think it was about 1921.

63040. Did you know, in 1921, that that was going to be the policy, that official control was going to become less and less every year? Did you realise that?—We realised that.

63041. I want you to throw your mind back to that year and tell us quite frankly whether, in 1921, you and your friends in the co-operative movement were happy and satisfied that you were going to have less of official surveillance or whether you then thought that the removal of that official help would bring trouble to the movement?—We did not think, at that time, that trouble would come.

63042. You were not in favour of official surveillance?—In those days, that was so.

63043. You have had a lesson and you have learnt by experience?—Yes.

63044. *Sir James MacKenna:* When was the District Central Bank opened?—In 1917.

(The witnesses withdrew.)

Mr. SAYA PAN, Ainggale Village, Tantabin Township, Insein District.

Replies to the Questionnaire.

QUESTION 1.—RESEARCH.—(*a*) (*i*) The main line of research should be into the scientific value of the indigenous theory and traditional methods of agriculture.

(*ii*) The present organisation of veterinary research is not equal to coping with the prevalence of cattle diseases in the Province.

(*b*) So far as my knowledge goes, progress is being made though slowly, and it appears that more scientific investigators are not needed at present, as the present staff of the Agricultural Department is adequate.

QUESTION 2.—AGRICULTURAL EDUCATION.—(*i*) The establishment of the Agricultural College and Research Institute at Mandalay is quite sufficient to meet the demand for agricultural education.

(*ii*) There is urgent need for extension of teaching facilities in all the districts in Burma.

(*iii*) Teachers in rural areas should be drawn from the agricultural classes.

(*iv*) There are no institutions for agricultural education in the districts.

(*v*) Propaganda work may be carried out to induce lads to study agriculture.

(*vi*) At present the boys of the agricultural classes have no chance of studying agriculture; they can only learn how to read and write.

(*vii*) Agriculture should be introduced in the existing courses of study in rural education.

(*viii*) As much practical work as possible may be introduced in (*x*) Middle-class youths should be shown, by demonstrations in the field, may grasp the value of practical lessons in relation to agriculture.

(*ix*) The majority of students who have studied agriculture are now serving in the Agricultural Department.

(*x*) Middle-class youths should be shown, by demonstrations in the field, that more advantages are possible by the study of agriculture, than by following old methods.

(*xi*) No.

(*xii*) Adult education in rural tracts may be popularised by demonstrating that more profits are obtained by improved methods.

(*xiii*) Agriculture should be introduced as a subject in rural education. (*a*) The teaching of this subject may be left with the Agricultural Department, whereas (*b*) it may be financed by the Government.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(*a*) Formation of pure seed societies with the purpose of joint growing of pure strains (*e.g.*, paddy in this district) and selling direct to millers without intermediary brokers, commission agents, has been successful. Premia of about ten or fifteen per cent have been offered by millers for improved paddy.

(*b*) Demonstration of pure, improved seeds (paddy) in comparison with cultivators' mixed varieties on the cultivators' own plots may be carried out.

(*c*) Demonstration is the principal method of inducing cultivators to adopt expert advice.

(*d*) Distribution to individual cultivators of pure seeds (paddy) produced by the Agricultural Department fails because the seeds get mixed up with other inferior varieties on the threshing floor. But if seeds are distributed to societies formed for the propagation and joint sale of pure seeds, the distribution may be successful.

QUESTION 4.—ADMINISTRATION.—(*b*) The supply of scientific staff for the furtherance of agriculture is always welcome.

(*c*) (*i*) From the agricultural standpoint the services afforded by the Agricultural Department are satisfactory. But with regard to the Veterinary Department, the increased preventive measures for cattle diseases are still needed.

(*ii*) From the agricultural standpoint the services of railways and steamers are satisfactory.

(*iii*) With regard to roads, we want bridges to be constructed over the streams which we have to cross on the way to the fields.

(*iv*) The districts of Insein, Tharrawaddy, Hanthawaddy and Maubin have been suffering very badly from heavy floods for about five years. It would be a relief to cultivators if the Government would take active steps to prevent such floods as much as possible.

(*v*) The services of posts and telegraphs are satisfactory.

QUESTION 5.—FINANCE.—(*a*) Agricultural operations should be better financed. Provision of long-term loans to cultivators is quite essential.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—(*a*) (*i*) The main causes of borrowing are (1) high cost of living and (2) regular floods in the district.

(*ii*) The sources of credit are the *chetty* firms, the agricultural loans of the Government, and the moneylenders.

(*iii*) Reasons preventing repayment are (1) failure of crops due to heavy floods and (2) high rate of interest.

(*b*) Protection against flood, long-term loans and low rate of interest are the principal measures to be taken to deal with rural insolvency. I am not acquainted with the Rural Insolvency Act or the Usurious Loans Act.

(*c*) Measures should be taken to control the credit of cultivators, for example, by limiting the right of mortgage and sale.

QUESTION 7.—FRAGMENTATION OF HOLDINGS.—(*a*) It has been the long-established custom to sub-divide the holdings with regard to importance, and it would be against the wishes of cultivators if this custom were interfered with.

(*b*) The customs regulating inheritance, and the lack of the spirit of co-operation are the obstacles in the way of consolidation.

(*c*) It would be better to keep disputes out of the courts.

QUESTION 8.—IRRIGATION.—(*a*) (*i*) In Insein district in Tantabin township, a large area of land, known as Bawlekyun between the Hlaing river and the Bawle river, suffers from heavy floods. It would be a relief if the course of a stream known as Kawmuchaung were straightened and extended. Floods would disappear, if the course of the Kanbyo Inchaung were extended, at a place below Tamartagaw village.

QUESTION 9.—SOILS.—(*b*) (*i*) The soils I know are black clayey soils and if rain water is sufficient they yield very heavily.

(*ii*) Sandy soils are suffering marked deterioration.

(*c*) To encourage the reclamation of areas of cultivable land which have gone out of cultivation, the Government should recommend fertilisers the application of which would be profitable to the cultivator.

QUESTION 10.—FERTILISERS.—(*a*) Cowdung has been used by cultivators, but as much as is required is not available.

(*c*) Demonstration of improved fertilisers may be carried out on the cultivators' plots and improved fertilisers popularised.

(*d*) Considerable increase in the use of manures has not recently taken place in any locality that is known to me.

(*e*) The Agricultural Department has demonstrated the good effect of ammonium sulphate for paddy nurseries.

(*f*) Most of the cultivators use cowdung as manure, while only a few Indians use it as fuel.

QUESTION 11.—CROPS.—(*a*) (*i*) It has been found that strains of paddy produced by the Agricultural Department have yielded a better outturn per acre and higher prices than the cultivators' mixed varieties.

(*ii*) In Insein district, fodder crops are not extensively put down, but in upper Burma, saccoline has been raised for fodder purposes.

(*iii*) Distribution of pure seeds (paddy) has been done in Insein district. Cultivators have made a joint sale of the produce, securing a premium from big millers. But the work is not so successful as it ought to be, owing to the floods that have been occurring for the past five years.

(*iv*) No damage is done by wild animals.

(*c*) About 6,000 baskets of paddy obtained by sowing improved seeds from Hmawbi agricultural station were jointly sold by cultivators to Messrs. Steel Brothers, Limited, Rangoon, with a premium of ten per cent in the year 1926. In Hlapada village, Insein township, 5,000 baskets have been sold to a broker with a premium of 10 per cent. A premium of eighteen to five per cent has been obtained for 6,000 baskets of improved paddy. For these reasons, societies for joint sowing and sale of improved paddy have sprung up, at the initiation of the Agricultural Department, in Insein district (west).

QUESTION 12.—CULTIVATION.—(*i*) Not much has been done to improve the existing systems of tillage which, however, would be more efficient, if the improved *Theikpan* ploughs designed by the Agricultural Department were used.

(*ii*) There is no customary rotation in Insein district; paddy is the only crop.

QUESTION 13.—CROP PROTECTION, INTERNAL AND EXTERNAL.—(*ii*) I would advocate the adoption of internal measures against infection.

QUESTION 14.—IMPLEMENTS.—(*b*) Demonstration of the improved implements on the cultivators' fields by district agriculturists has been very successful. Thus the *Theikpan* plough has become very popular now.

(*c*) I do not think that any special difficulties confront the manufacturers.

Mr. Saya Pan]

QUESTION 15.—VETERINARY.—(*b*) (*i*) There are not sufficient dispensaries under the control of the district boards, and consequently this system does not work satisfactorily.

(*ii*) The need for expansion has not been adequately met.

(*iii*) Under whatever authority it may be, the only thing that I want is efficiency.

(*c*) (*i*) Up to the present, agriculturists have not made full use of the veterinary dispensaries. It is for those concerned to make further improvements.

(*ii*) No such touring dispensaries are known in this district.

(*e*) The serum supply system seems to be unsatisfactory at present.

(*f*) No fee is charged.

(*g*) Provision of further facilities for research into animal disease is highly desirable; it should take the form of setting up a provincial veterinary research institute.

(*h*) So far as special investigations are concerned, they may be conducted by (i) the officers of the Muktesar Institute or (ii) research officers in the Provinces.

(*i*) The appointment of a superior veterinary officer with the Government of India would indeed increase the efficiency of the Veterinary Department.

QUESTION 16.—ANIMAL HUSBANDRY.—(*a*) (*i*) Improvement of the breeds of livestock is highly desirable.

(*ii*) It is doubtful whether the betterment of the dairying industry would be of any benefit to Burma.

(*iii*) It would be better if the existing practice in animal husbandry were improved by the authorities concerned.

(*b*) (*i*) The existing grazing grounds are sufficient for the cattle.

(*ii*) There are no enclosed pastures.

(*iii*) Grass and paddy straw provide quite sufficient cattle fodder in Insein district.

(*iv*) In dry seasons, *kaing* grass is available for green fodder in lowland areas in Insein district.

(*c*) It cannot be said that fodder is scarce in this district (Insein) in summer; but scarcity of fodder may exist for four weeks. Young growing cattle do not suffer from any appreciable scarcity of fodder.

QUESTION 17.—AGRICULTURAL INDUSTRIES.—(*a*) Cultivators are engaged in field work from about May (*Kason*) to October-November (*Thadingyut-Tazaungmon*), after which they are engaged in other lighter work. Cultivators in this district are engaged in field work for about ten months in the year. The slack season lasts for about two months in summer, when they have to cart fuel, bamboo, etc., to provide for the rainy season.

(*b*) It appears that cultivators have no spare time to take up subsidiary industries. Labourers who have to work at the cultivators' houses may be encouraged to take up some subsidiary industry.

(*c*) Fruit-growing is interesting to some cultivators, but the scarcity of land is an obstacle. As for bee-keeping, sericulture, lac-culture, etc., the religious sentiment that life-taking is a sin is the greatest obstacle. Rope-making and basket-making are practised all over the district.

(*d*) I would request that the Government should do more to establish industries connected with the preparation of agricultural produce, such as oil-pressing, sugar-making, etc.

(*e*) Encouraging industrial concerns to move to rural areas would give subsidiary employment to the rural population.

(*f*) I would recommend a more intensive study of each rural industry in its technical, commercial and financial aspects, with a view, among other things, to the introduction of improved tools and appliances.

QUESTION 18.—AGRICULTURAL LABOUR.—(*a*) (*ii*). Allotment of cultivable land to labourers in the Province would induce them to shift from areas where there is a surplus of labour.

(*b*) There seems to be no appreciable shortage of labour in this Province, sowing and planting of paddy being done by indigenous labourers. But as for reaping, coolies from India meet the labour demand temporarily. If there is any scarcity of labour, it is due only to the tendency of labourers to take to gambling, etc. If this tendency can be corrected, the labour demand at the reaping season from India might be reduced by one-third.

(*c*) To facilitate the occupation and development of areas not at present under cultivation, the surplus agricultural labour may be employed in colonisation schemes carried out in Kadonbaw in Hanthawaddy district and Yekkangyi in Pegu district.

QUESTION 19.—FORESTS.—(*a*) In my opinion, forest lands are utilised for agricultural purposes to some extent. Cattle are allowed in some forest lands, but where the practice is not compatible with the proper reservation of forest areas it is not the case. This is as it should be. Government should, however, see to it that cultivators are allowed to extract wood for fuel for making agricultural implements without taking out a license.

(*c*) To remedy erosion and damage from floods due to deterioration of forests would be a difficult matter.

(*e*) Any scheme of afforestation in the neighbourhood of villages would be detrimental to the interests of cultivators with regard to the grazing of their cattle.

(*f*) I do not know any case of forest suffering deterioration from excessive grazing. Grazing in newly afforested area would, however, injure young plants.

QUESTION 20.—MARKETING.—(*a*) The present level of prices for agricultural products is somewhat high for indigenous consumers and therefore increased market facilities, so far as foreign trade is concerned, would be detrimental to their interests.

(*c*) In Burma paddy is by far the most important crop and the chief endeavour of the Agricultural Department should be towards the gradual replacement of the present inferior varieties of paddy by the improved strains selected by the department.

(*d*) Yes.

QUESTION 22.—CO-OPERATION.—(*a*) (*i*) Government should always foster the growth of the co-operation movement and anything likely to adversely effect the progress of the movement should be promptly met by remedial measures initiated by Government.

(*b*) (*i*) The present demoralisation of credit societies calls for strong action on the part of Government.

(*iii*) The existing conditions are such as to discourage the formation and successful working of such societies, and help from Government would be greatly appreciated.

(*iv*), (*v*), (*vii*) & (*viii*) No such societies are in existence at present, nor is there any likelihood of their formation in the near future.

(*vi*) Cultivators are not in a position to make use of such societies.

(*ix*) Pure seed societies, among cultivators who use the improved paddy varieties of the Agricultural Department for seed purposes, with the main object of joint marketing of their superior produce, are being formed and are gaining popularity.

(*c*) No such steps should be taken.

(*d*) I do not think so.

QUESTION 23.—GENERAL EDUCATION.—(*a*) (*i*) Higher education is not needed for those who make a living out of the land.

(*ii*) Facilities should exist for the spread of secondary education among the rural population.

(*iii*) Elementary education is of too low a standard for cultivators to be appreciably benefited by it.

(*b*) (*i*) The educational system, at least in rural areas, should have a decided agricultural bias.

(*iii*) It is because the present form of education has no practical bearing whatever on the profession which the rural boy is to take up when he comes of age, namely, farming.

Mr. Saya Pan]

QUESTION 24.—ATTRACTING CAPITAL.—(*a*) It is an impossible task so far as this country is concerned to attract masses of capital to farming.

(*b*) The chief factor is ignorance.

QUESTION 25.—WELFARE OF RURAL POPULATION.—(*b*) Yes. Such enquiries should be held with a view to finding out those who are really in need of, and likely to be benefited by, agricultural loans.

(*c*) Although I have not conducted a systematic enquiry, I have come to know that the root cause of the economic stringency of the cultivators of this country is the usurious rates of interest which they are forced, by economic pressure, to pay for their borrowed capital.

QUESTION 26.—STATISTICS.—(*a*) (*i*) & (*ii*) I have no particular suggestion but I am of opinion that there is still much room for improvement.

(*iii*) & (*iv*) I doubt whether such statistics would be of any practical value.

(*v*) Such statistics are of value.

U TUN of Danubyu, Representative, the Burmese Chamber of Commerce.

Replies to the Questionnaire.

QUESTION 2.—AGRICULTURAL EDUCATION.—(*i*) There is only one agricultural institution established by Government and that is the Agricultural College at Mandalay. In my opinion it is a regular white elephant to Burma, boasting of grand buildings and a highly paid staff of superior officers. It is obviously insufficient for the needs of Burma, over seventy per cent of whose population are agriculturists.

(*ii*) There is urgent need for agricultural schools in all agricultural districts.

(*iv*) Imparting agricultural education in Burmese, publication of books and literature bearing on agriculture in Burmese, and furnishing convincing proof of the economic advantages to be gained from agricultural education will greatly stimulate the demand for instruction.

(*viii*) Nature study, school plots and school farms should be encouraged in every way in all schools. They furnish a very good means for training students in observation and practicality and knock the false sense of dignity out of their young heads.

(*ix*) Agriculture may be made attractive to middle-class youths by bringing home to them the advantages of agriculture and giving them every encouragement to occupy and develop available waste land, with financial aid where necessary.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(*a*) There does not seem to be any measure which may be considered to be successful in influencing and improving the practice of cultivators, except perhaps the distribution of better seeds. It is worse than useless for the Agricultural Department to take up the best available areas, make experiments regardless of expenditure and expect cultivators to make improvements on such lines. Cultivators are naturally not over-confident that they will achieve success under the much worse conditions prevailing on their lands. They also lack the knowledge and facilities that the Agricultural Department has. They cannot, moreover, afford the expense that Government can.

(*b*) Field demonstrations to be effective should be made on the land of the cultivator. Then only, he and his neighbours will be convinced of the benefits of the practice demonstrated. Tactful dealing with cultivators, free from red-tapism, will go far towards removing their suspicions and prejudices. The practice demonstrated should not involve heavy expenditure of money and energy.

(*c*) Easy accessibility, cheapness, promptness of response and conviction as to the benefits of expert advice appear to be the best inducements to cultivators to seek and adopt it.

QUESTION 4.—ADMINISTRATION.—(*c*) (*i*) They are not as closely in touch with cultivators as might be desired. The Agricultural Department with its highly paid officials at the top has been in existence for a quarter of a century or so, but there has been no appreciable improvement in agricultural methods or conditions.

(*ii*) No; there are not enough railways and steamers. The services rendered by them leave much to be desired. There is a notorious scarcity of wagons and cargo boats where they are most needed during the paddy season.

(*iii*) No. Roads are conspicuous by their scarcity. It is highly objectionable to waste huge sums of money on the construction of a trunk road between Mandalay and Rangoon for the use of motorists when inter-village roads that would facilitate the transport of agricultural produce are a crying need.

(*iv*) No. The common cultivator does not even know of the existence of the Meteorological Department, still less the weather reports it issues. It should publish its reports in all vernacular newspapers as well as through the radio.

(*v*) No. The postal service in Burma is extremely unsatisfactory. To give one instance only: it takes three days for mails to get from Rangoon to Danubyu or *vice versa*, a distance of less than a hundred miles. The Postmaster-General should find out and use the shortest routes for despatch of mails. Expedition of despatch and extension of postal service to rural areas is also greatly needed.

(*vi*) No. The telegraph service leaves much to be desired. In this case also expedition of despatch and extension of service to rural areas is greatly needed.

Wireless is still in its infancy. It can render great service to agriculturists, if market reports, weather reports, crop reports and short lectures of particular interest to agriculturists are broadcasted by radio regularly.

QUESTION 5.—FINANCE.—(*a*) Government should establish land mortgage banks in all agricultural districts and give easy loans at low rates of interest to *bona fide* agriculturists for agricultural operations.

Considerate treatment and extension of the terms of repayment, both short and long, in cases in which the inability to repay is due to causes beyond the cultivators' control, will put them in a better position to repay loans than putting undue pressure on them, which often spells their ruin.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—(*a*) (*i*) The main causes of borrowing are want of means for agricultural operations, for buying cattle, seed and for *wunza* (domestic purposes), failure of crops, disease and death of cattle, disease and death in the family, high rates of interest charged by moneylenders, want of thrift and the existence of legalised gambling.

(*ii*) The sources of credit are *chettyars* and local moneylenders.

(*iii*) The reasons preventing repayment are the same as the main causes of borrowing, with the exception of the first cause.

(*b*) I do not think special measures should be taken to deal with rural insolvency. Buddhists, who form the majority of cultivators, feel it to be incumbent upon them to repay loans in future existences, if not in this world. They will, therefore, try their level best to repay them in this world, whereas the protection of the Insolvency Court will tend to ease their conscience, lead to reckless borrowing and will worsen their indebtedness.

The Usurious Loans Act should be applied with discrimination. The remedy already lies in the Government's lending money at low interest. This will undoubtedly lower the general rate of interest.

Loans by Government at low interest to take over existing mortgages will greatly facilitate the redemption of mortgages.

(*c*) No.

QUESTION 9.—SOILS.—(*c*) Government should give cultivators financial and technical aid to reclaim areas of cultivable land which have gone out of cultivation.

QUESTION 10.—FERTILISERS.—(*a*) I think greater use could be profitably made of natural manures than of artificial fertilisers. Green-manuring and silting can be advantageously carried out where mechanical power is employed in agricultural operations.

(*b*) It is very difficult to prevent adulteration of fertilisers.

(*e*) Nothing can be better than practical demonstration which is convincing as to economy and better yield to popularise new and improved fertilisers.

(*f*) Burmese cultivators do not use cowdung as fuel; they use it for manuring purposes.

QUESTION 11.—CROPS.—(*a*) (*i*) Existing crops do not seem to have improved in any way. Much ground has yet to be covered in the matter of educating cultivators to raise improved crops on scientific lines.

(*ii*) Very little headway seems to have been made in the introduction of new crops, including fodder crops.

(*iii*) The distribution of pure and suitable seeds seems to leave much to be desired. The average cultivator generally does not know where such seeds are available. Even when they come to know if the source of supply, they are rather shy of red-tapism. It would, therefore, be more advantageous to distribute seeds from township headquarters, advertise their qualities and the kind of soil for which they are suitable, and make the distributing centres as easily accessible to the common cultivator as possible.

QUESTION 12.—CULTIVATION.—(*i*) Very little improvement can be made in the existing systems of tillage. The average cultivator is reluctant to adopt new improved implements and methods if they involve extra expenditure of energy and money. However, there are educated young men who are alive to the advantage of power-farming and are ready and willing to use motor tractors with improved implements, and power plants for other kinds of farm-work. But the difficulties of getting sufficient capital and suitable land to be worked with tractors, etc., stand in their way. Government will do well to encourage them by giving them every facility.

(*ii*) Rotations and mixtures of crops are of little or no use unless made on scientific lines. Knowledge of such scientific rotation and mixtures should be systematically imparted to cultivators not only through the medium of leaflets, but also by means of cinema films, radio-broadcasting and practical demonstration.

QUESTION 14.—IMPLEMENTS.—(*b*) I would suggest practical demonstration, issue of long-term loans of sufficient amount and holding of competitions of the performance of such tractors and implements.

(*c*) Lack of knowledge of local conditions on the part of manufacturers stands in the way of their producing implements and machines suitable for this country. As regards distribution, it cannot be said to be widespread. Middlemen's profits put the initial cost beyond the means of the average cultivator.

Distribution of such implements and machinery by Government or co-operative societies at cost price on easy instalments will go far towards making them popular.

QUESTION 16.—ANIMAL HUSBANDRY.—(*a*) (*ii*) There is a good deal of room for improvement in this industry. The supply of milk in large towns, especially Rangoon, is extremely unsatisfactory. Government or co-operative organisations should take up this matter systematically and run the industry in a businesslike way. There does not appear to be injury to cattle from overstocking of common pastures.

(*b*) (*ii*) The usual practice in delta districts is to stall-feed cattle with grass reaped from *kazins* during the rains, and to graze them in fields after harvest. Therefore there does not seem to be any injury to cattle owing to absence of enclosed pastures.

(*iii*) There also does not appear to be any injury to cattle on account of insufficiency of dry fodder in Lower Burma, as it is generally to be had in plenty.

(*v*) No case of injury to cattle for want of mineral constituents in fodder and feeding stuffs has come to my knowledge.

QUESTION 17.—AGRICULTURAL INDUSTRIES.—(*a*) An average cultivator works about six months or 180 days in the year. In the slack season, Burman cultivators go after amusements, *payapwes* (pagoda festivals) and *phongyibyans* (funeral ceremonies of *phongyis*).

(*b*) The making of rice-starch, rice-flour, straw-mats, bags and packing, straw-ropes, straw-boards, straw-pulpware, growing of other crops by means of irrigation where practicable, spinning, weaving and basket-making, may be established with Government aid.

(*c*) Bee-keeping, poultry-rearing, sericulture, pisciculture, and lac-culture are against the sentiments of Buddhists who form the majority of cultivators. The obstacles in the way of fruit-growing appear to be difficulty of transport and inability to combat pests. Want of proper knowledge is an obstacle in the way of rope-making and basket-making.

(*d*) Yes. Government should encourage, in every way possible, the establishment of the industries mentioned on the cottage scale.

(*f*) Yes.

(*g*) Raising more crops than one, with the help of irrigation where practicable, will lead to greater rural employment.

QUESTION 18.—AGRICULTURAL LABOUR.—(*a*) Employment of cultivators during the slack season in works under the Public Works Department or district councils will keep them occupied and enable them to earn more. Their standard of living is much higher than that of Indian coolies; yet I think it will be more economical to employ them. Their unemployment has been a fruitful cause of their deplorable poverty which has been commented upon in Mr. T. Couper's Report on 'Agricultural Conditions', and the Flood Enquiry Committee's Report. (I may mention, in passing, that the prohibitive price of this latter Government publication, namely, forty rupees, is a bar against its popularity.) It is admitted on all hands that rural unemployment and poverty are directly responsible for the scandalous increase of crime in Burma. It is, therefore, evident that employment, prosperity and peace have far-reaching economic results that should outweigh immediate consideration of rupees, annas and pies.

(*b*) The causes of labour shortage are the nature of the operations that demand a large number of hands urgently and the insufficiency of local labour population. The remedy appears to lie in employment of labour-saving and time-saving machinery.

QUESTION 20.—MARKETING.—(*a*) No. As far as paddy is concerned, market facilities are conspicuous by their absence. The market is more or less in the clutches of big millers who buy and mill paddy for export. By means of the Bullinger system, as to which questions were asked in the first Legislative Council of Burma, they so manipulate the paddy market as to make it highly detrimental to the interests of cultivators.

Another factor which adversely affects the paddy market is undue pressure by *chettyars* who are in turn said to be pressed by their banks for repayment of loans when paddy prices are low.

At this critical moment come Government tax-collectors who, with the weight of official authority behind them, exact the payment of taxes regardless of the hardship which cultivators have to suffer. They vie with one another to complete revenue collection before the end of March.

These factors force cultivators to sell their paddy at the prices dictated by the ring. One of the inevitable results is the poorness of the quality of paddy thus obtained, for adulteration is resorted to by traders, if not by cultivators, or both, to match the quality of paddy with the low prices available. The Bullinger system, or any other system or ring that lowers or keeps down the market for agricultural produce should be prohibited by law, if necessary.

Loans to cultivators from Government banks, and considerate treatment by bank officials so as not to cause hardship to cultivators, should relieve them greatly.

There should be relaxation in the rule for closing of accounts at the end of March. If possible, it should be postponed till the end of June. Government tax-collectors should also be instructed to be more considerate towards cultivators in their demand for revenue.

Co-operative sale societies should be established at all district headquarters at first and gradually spread to township headquarters and more important villages. Every facility and help should be given to such societies to build godowns for storage of agricultural produce. Monetary advances should be made by co-operative banks to the members storing their produce in such godowns.

(*d*) Such information and news should be published not only in the Burmese newspapers but also by radio-broadcasting both in English and Burmese.

QUESTION 23.—GENERAL EDUCATION.—(*a*) The existing system of education is by no means conducive to increasing the agricultural efficiency of the people. On the other hand, it has served to create false notions, set up false aristocratic ideas and alienate the younger generation from agricultural pursuits. Hankering after clerkships, etc., should be deprecated and discouraged in schools and colleges and an appreciation of the dignity of labour, and the benefits and prospects of agricultural occupations should be instilled into the minds of students.

(*b*) (*i*) Rural education should consist mainly of the three R's. Moral training should play the leading role. Applied agricultural knowledge should also be imparted.

QUESTION 24.—ATTRACTING CAPITAL.—Enterprising Burmans may be induced to take to agriculture if Government encourages them by facilitating their occupation of sufficient areas of land to be worked by machinery, by granting exemption from taxes and rates where necessary, and by giving loans. The present policy of Government in taking up thousands of acres of cultivable land and forming Government estates is objectionable, because men of capital and education will not come forward to take to agriculture when they have no chance to own land and work it without any restriction. It kills their initiative and incentive and fetters their freedom of development.

U PO HAN, Messrs. U PO HAN & CO., Rangoon.

Replies to the Questionnaire.

QUESTION 14.—IMPLEMENTS.—(*a*) (1) From practical experience the "Case" power-farming machinery, such as tractors, ploughs and harrows, have proved to be the best and well suited for this country's needs.

(2) Several "Case" tractors and implements are being used to-day in Pegu, Toungoo, Hanthawaddy and Maubin districts. The result is most satisfactory giving better outturn.

(3) The advantages of "Case" power-farming machinery are numerous and the "Case" dealers in Rangoon are prepared to demonstrate and teach interested farmers. Full literature in English and Burmese could be had free on application.

(*b*) To hasten the adoption of improved implements by cultivators the Government should loan a sufficient amount of money to landowner-cultivators for the purchase of a complete set of necessary "Case" power-farming machinery. The cost would be about Rs. 4,810, such loans to be paid back to Government in two years.

(*c*) There are no difficulties whatsoever. "Case" agencies are established throughout India and Burma and are prepared to give all assistance in the use of power-farming machinery. Orders could be executed immediately for ordinary implements, but for specific machinery, six to eight weeks time is required. Spare parts, etc., are always available from the "Case" dealers.

QUESTION 24.—ATTRACTING CAPITAL.—(*a*) Government should freely give grants of land to *bonâ fide* applicants free of land revenue for three years. One of the conditions should be that power-farming machinery must be adopted.

(*b*) *Factors tending to discourage owners of agricultural land from carrying out improvements.*—There are various factors :—

(1) Want of funds.

(2) Lack of knowledge of the methods of power-farming machinery.

(3) Want of help and sympathy from the district officials,

Mr. SAYA PAN, U MAUNG GALE, U TUN and U PO HAN, Representative Agriculturists from Lower Burma.

Oral Evidence.

63045. *The Chairman:* Mr. Saya Pan, U Maung Gale, U Tun, and U Po Han, you are here as representative agriculturists from Lower Burma?—Yes.

63046. I understand that you are agreed that U Tun should speak for the group: is that so?—Yes.

63047. If any of the rest of you do not agree with what U Tun says please tell the Commission and we shall be glad to hear your views?—Very well.

63048. I am going to ask you one or two questions based on the notes that you have provided. From your answer to Question 2, U Tun, I gather that you are not quite satisfied with the Agricultural College at Mandalay?—No.

63049. You think that one centre is not enough: you want more?—We want more schools than colleges at present.

63050. But, you see, Mandalay is to be an Agricultural College and not a school for the public in the ordinary sense?—Quite so.

63051. I expect you realise that it would not be possible, if you had a number of colleges spread over the country, to equip each one as well as you could afford to equip one centre?—Quite so. That is why my opinion is that there should be schools rather than just one college at Mandalay.

63052. What do you mean exactly when you use the word 'school'?—We do not want high qualifications for entry in schools.

63053. Not for your agriculturists, but surely you do not want the officers of your department to be anything but first class?—They should be well trained no doubt but they could be trained by other means, I think.

63054. Are you thinking of middle schools with an agricultural bias or something of that sort?—Yes, or *pucca* agricultural schools if possible.

63055. At what age would you like to see a son of yours sent to an agricultural school?—About fifteen years.

63056. Not before that?—No.

63057. You do not confuse primary education with vocational training?—No.

63058. You give us an interesting view about demonstration farms. You think that the cultivator always regards them with suspicion, because he knows that Government funds are available: is that so?—Yes.

63059. And you think that the most effective means of showing the cultivator the improvements which the department recommends is to go to the cultivator's own fields and, in the conditions which he knows so well, to demonstrate the economic superiority of the new crop or the new method?—Quite so.

63060. You use the words 'Bullinger system' at one stage of your note. What is the Bullinger system?—It is a sort of pooling system followed by the rice-millers. They agree among themselves to confine the buying to one particular mill or to two mills, so that there may be no competition between them. Thus the price of paddy is kept down very effectively as there is no competition and afterwards, I understand, they pool the paddy purchased.

63061. In reply to Question 6 (*b*) you say: "I do not think special measures should be taken to deal with rural insolvency. Buddhists who form the majority of cultivators feel it incumbent on them to repay the loans in future existences, if not in this world." Does that attract the lender at all, do you think?—Yes, I think so.

63062. On page 196 you are recommending certain reclamation. Have you any specific schemes in mind?—No, I have no particular scheme or schemes in mind; I am merely generalising.

63063. Are you thinking of reclaiming delta lands or something of that sort?—There seems to be some necessity for *bunding* up certain areas in the delta.

63064. Has it ever occurred to you that the silt which goes down to the sea in the Irrawaddy and other great rivers of Burma represents so many rupees if you could only get it on to the land?—I quite realise that.

63065. There are seasons in the year when the flood rises above the level of the land in certain districts?—Yes.

63066. Do you think it might be a great advantage, by means of sluice gates, to get the silt laden waters discharged over the agricultural lands?—Yes.

63067. In answer to Question 16 (*a*) (*ii*), you appear to suggest that there is a market for fresh milk in Rangoon. Is that the result of any close study of the market, or just a general impression on your part?—Just a general impression.

63068. With regard to Question 23 (*a*), you say that the existing system of education is by no means conducive to increasing the agricultural efficiency of the people, that it tends to create false notions, set up false aristocratic ideas, and alienate the younger generation from agricultural pursuits. What particular grade of education are you thinking of there?—The higher grades, and of course also the middle schools.

63069. Is it your view that secondary education has not penetrated into the rural areas at all?—Not to the desired extent.

63070. I do not see how, if it cannot penetrate, it can have the effect that you suggest it has?—My idea is to spread secondary education in rural areas on reformed lines.

63071. Are you a cultivator yourself?—I happen to own some land. I am part-owner of a small area which is let out to tenants. But I am going to take to agriculture personally.

63072. You do not, in fact, cultivate any land yourself?—I have not done so.

63073. Are you a practical farmer?—I am going to be.

63074. Have you ever been a practical farmer?—No.

63075. Now I shall turn to Mr. Saya Pan's note. Are you a practical farmer, Mr. Saya Pan?—Yes. I have been a practical farmer all my life.

63076. Have you yourself held the plough?—Yes.

63077. Do you still hold the plough from season to season?—Yes, and I am helped by my labourers also.

63078. Do you own land?—No.

63079. How much land do you cultivate?—About 53 acres have been cultivated by me this year.

63080. How many pairs of bullocks do you keep?—Three pairs.

63081. Do you hire others?—Yes.

63082. How many pairs of bullocks do you require to cultivate 53 acres?—Four yokes.

63083. Are you satisfied with the quality of the draught oxen?—Yes; I am satisfied.

63084. Does fodder present any difficulty at any season of the year?—Not in my locality. (*U Maung Gale*) In my locality I experience difficulty about fodder. I come from Pegu.

63085. Mr. Saya Pan comes from the Insein district?—(*Mr. Saya Pan*) Yes.

63086. U Maung Gale, at what season of the year do you find this fodder shortage most acute?—(*U Maung Gale*) During the working season.

63087. What do you give your bullocks during that season?—The little grass that grows on the *bunds*.

63088. Do you store any fodder in seasons of plenty?—We used to store straw or hay.

63089. Do you mean paddy straw or hay?—Paddy straw. Paddy straw is sometimes left over from one season to another.

63090. When you say you used to store paddy straw, do you wish us to understand that you no longer store paddy straw?—I have always to keep a stock of paddy straw, so that whenever there is need of fodder I can draw upon it.

63091. How comes it that if your store of paddy straw is sufficient, you say that you often suffer from shortage of fodder?—Sometimes the straw gets spoiled by rain water. Moreover, the cattle like grass better than paddy straw; they get more nourishment from grass than from paddy straw.

63092. Do you grow any crop other than rice?—(*Mr. Saya Pan*) I grow only paddy in my land; my land does not admit of any other kind of crop being grown.

63093. Do you also grow only paddy?—(*U Maung Gale*) Yes.

63094. Do you grow any seed recommended by the Agricultural Department?—(*Mr. Saya Pan*) I myself, as well as the society to which I belong, grow the seed supplied by the Agricultural Department. (*U Maung Gale*) We tried the seed supplied by the Agricultural Department, but owing to lack of sufficient instruction supplied to the cultivators, they were not able to grow it successfully. So, we gave it up.

63095. Did you actually put the departmental seed into your land?—(*U Maung Gale*) Yes ; I have got receipts for the seed bought from the Government department. I had to pay a good price for the seed, but I could not get an adequate price for the crop grown.

63096. Your trouble was that you did not get, as a cultivator, a fair share of the better price which ought to have followed from your producing the improved rice?—The small tenants who grew these seeds could not produce a sufficiently large amount to attract the brokers; the quantity being small, the brokers did not pay any attention to it and they took it up with the rest; so the cultivators did not get the premium.

63097. U Maung Gale, you yourself do not cultivate; do you?—For two years I have actually handled the plough and ploughed the land with my own hands.

63098. Do you do it now?—No.

63099. U Po Han, do you own land?—(*U Po Han*) Yes.

63100. Do you cultivate it yourself?—I own the land, and I have experimented with machinery on my own land.

63101. *Sir James MacKenna:* You are an importer of machinery?—Yes; I have got experience of cultivation.

63102. *The Chairman:* Do you actually make the machinery?—I stock it and sell it.

63103. So that, in the note in which you advertise the admirable qualities of the "Case" power-farming machinery you have your own business in view?—Yes.

63104. What range of machinery does that include?—Tractors, ploughs and harrows.

63105. Are they bullock-power ploughs and harrows?—These are power machinery, not machinery worked by cattle. Our machinery is for dry land only.

63106. You could not work your tractors on wet, muddy land?—No; it is impossible.

63107. Is there great diversity of practice between district and district, village and village, and even between individuals in one village, as to the size of basket used for marketing rice?—(*Mr. Saya Pan*) Yes; there is a difference.

63108. Does that lead to any difficulties?—(*U Maung Gale*) No, because people are also used to selling rice by weight.

63109. Do they pay the cultivator by the basket?—They buy by the basket and they pay the cultivator by the basket.

63110. So that, from the cultivator's point of view, it is extremely important that he should have fair value for the contents of his basket?—Yes.

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Mr. Reynolds: I think that the reply that the witness gave to the previous question was that the cultivator is paid according to the price of that measure, which may vary.

63111. *The Chairman:* Do you cultivate any of U Ba Maung's land?—No; he is in a different district altogether.

63112. Do you think that it would be to the advantage of the cultivator if a standard basket were adopted?—Yes, I am in favour of a standard basket.

63113. Everybody would then know exactly what they meant when they talked about a basket of rice?—Yes.

63114. Do you think that the cultivators as a whole would be prepared to welcome an attempt by Government to fix a standard basket?—Speaking for the Insein district, I should think so.

63115. Mr. Saya Pan, do you think that the confusion which results from the present unevenness in practice, and the present use of baskets of different measures, results in the cultivator losing and the buyer gaining, in the majority of cases?—When the cultivator sells by small baskets, the traders may suffer, but when they have to sell by big baskets the cultivators suffer. So, if the basket is standardised, it will be a great benefit.

63116. I want to be quite clear about your opinion on this point, U Maung Gale. As a representative owner of land, do you think that the standardisation of the basket would be to the public advantage?—I think that it would be an advantage if a basket of fixed capacity were made the standard, and if it were made illegal to use a bigger or smaller basket.

63117. U Tun, I think you refer to artificial fertilisers?—Yes.

63118. You have taken an interest in the matter?—Yes.

63119. Where have you heard about improved fertilisers? Has there been any agency recommending artificial fertilisers in Burma, to your knowledge?—Not for any artificial fertilisers, as far as I know. I am in favour of natural manures.

63120. Have any of you taken any interest in artificial fertilisers?—(*U Maung Gale*) We use cowdung only. We cannot afford to have any other kind of manure.

63121. Mr. Saya Pan, what do you think about the advisability of introducing compulsory primary education in Burma?—I am in favour of compulsory primary education.

63122. What is your opinion about it, U Maung Gale?—I am in favour of it, provided the expense of school-fees is not very high.

63123. And, what is your opinion, U Tun?—I am in favour of it, provided it is not very expensive.

63124. Are you also in favour of it, U Po Han?—Yes. (*U Maung Gale*) I want the teaching to be done in Burmese.

63125. Is there much demand for teaching colloquial English?—(*U Maung Gale*) We want English education, but we cannot afford to have it. When I said that the teaching should be in the vernacular, I was referring to agricultural education, and not to ordinary primary education. Even though a man does not know English, can he not go and do some cultivation?

63126. U Maung Gale, is there any demand for teaching colloquial English amongst parents of children of school-going age in your district?—Yes, they are in favour of their children being taught English, but they cannot afford it.

63127. Are you a candidate for the district board?—I am nominated by the Government.

63128. Are you a member of the local district board?—I am chairman of the circle board.

63129. Would you be prepared to say that there is no urgent demand for teaching any colloquial English in the primary system in your district?—Considering the expense, how can this education be given? The people are very poor, and they have not enough to live upon.

63130. Provided they can get it at their own price, do they want vernacular education and a chance to learn English as well?—Yes, I mean that.

63131. *Professor Gangulee:* U Tun, you said you proposed to go in for farming?—(*U Tun*) Yes.

63132. What led you to decide to do that?—I think it is more conducive to the prosperity of the people than anything else.

63133. What exactly are you doing now?—I am not doing anything at present.

63134. What sort of farming are you proposing to do: rice farming?—Whatever is suitable for the land I am asking for.

63135. *U Ba Cho:* You speak of the Bullinger system by which the rice is bought by the great millers?—Yes.

63136. Who are the big millers?—European millers, Steel Brothers and others who export to foreign countries. As a member of the Legislative Council you must be aware of that, because questions were asked in the last Council.

63137. Yes, but I want to get it from you. You attribute the falling off in the price of rice to this system?—That is one of the factors causing the fall in price; it is a very potent factor.

63138. You mean that these big millers buy the bulk of the rice of Burma?—Yes, certainly they do.

63139. What percentage of the export rice do they buy?—Not less than seventy-five per cent, in my opinion.

63140. Have you had any experience of the rates charged on the Burmese railways for paddy?—I have no experience.

63141. *Sir Thomas Middleton:* How many acres do you put under rice each year?—(*Mr. Saya Pan*) Last year a hundred acres; this year fifty-three acres.

63142. Do you cultivate all that land with four yokes of oxen?—I had to hire other yokes elsewhere.

63143. You have told us you have four yokes of your own; how many did you hire?—Last year when I cultivated a hundred acres I had eight ploughs.

63144. Are your plough cattle stronger than the cattle of your neighbours?—No, they are all the same.

63145. You recommend the new plough that the department has introduced, the *Theikpan* plough I think it is called?—Yes.

63146. What advantage do you find in it as compared with your old plough?—The difference lies in the fact that with the *Theikpan* plough instead of using two ploughshares one alone can be used; it saves time, the surface is even and the composition of the soil is even after ploughing with the *Theikpan*.

63147. It saves time, that is the point. You have about fifty acres of land yourself you told us?—I rent it; I had fifty acres this year and a hundred acres last year.

63148. What rent do you pay?—Fifteen baskets of paddy per acre.

63149. *Sir James MacKenna:* Who pays the revenue?—The owner of the land.

63150. *Sir Thomas Middleton:* How much were you paying for these extra ploughs you hired last year?—Seventy-five baskets of paddy per yoke.

63151. How many baskets did you get per acre from this land?—I cannot give you the normal average outturn per acre, because floods and other disasters occurred; but I realised 750 baskets of paddy from my 100 acres.

63152. Last year was an exceptional year; so that I will not ask further questions about that. When you hire labour for harvesting rice, how do you pay that labour: by produce or by money?—In kind, in paddy.

63153. *Mr. Calvert:* Have you ever known a case in which the plough bullocks or implements of a cultivator have been seized in execution for a debt?—(*Mr. Saya Pan*) Yes, in Tantabin township.

63154. Is it a fairly common thing for a civil court to attach and sell plough cattle for a decree for debt?—Yes.

63155. *Mr. Reynolds:* After the rains have broken properly, I suppose it is impossible to do tractor work?—(*U Po Han*) Yes, it is only a dry-ploughing system; you get everything done in the dry season.

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63156. You plough just after the first showers?—Yes, about seven days after the first shower.

63157. You plough with a tractor?—Yes.

63158. You broadcast?—Yes.

63159. You cannot do anything then until the water goes down?—We have to wait until the water has gone down.

63160. Has the whole of your crop been destroyed this year or have you been able to reap some?—There is nothing wrong at present with my experimental land; I hope everything will turn out satisfactorily.

63161. How many years have you been working the land?—This is the first year. Some tractors were brought in from America and in some places we are trying them experimentally; all those show satisfactory results.

63162. *The Chairman:* How many tractors have you sold already?—Seven altogether.

63163. How long have you been in the business?—From 1914.

63164. Is there any particular point any of you, gentlemen, would like to bring up? We have your notes of evidence, of course?—(*Mr. Saya Pan*) I have nothing further to add except that we want plenty of junior officers to be appointed in the Agricultural Department.

63165. A bigger staff?—Yes, to be recruited from among the agricultural classes.

63166. You wish that, if possible, junior officers of the Agricultural Department should be drawn from the cultivating classes?—Yes. That is my point and they should also go about and make demonstrations in the fields. They should take with them plenty of seeds and actually sow them and demonstrate to the cultivators the methods of sowing.

(The witnesses withdrew.)

U PAW TUN, A.T.M., M.L.C., Bar-at-Law, Mr. J. L. DUMONT, B.Sc. (Edin.), and U KHIN MAUNG, B.A., M.L.A.

Replies to the Questionnaire.

QUESTION 1.—RESEARCH.—(*c*) Careful investigation is required into the cause of crop destruction by insect pests. While some insects like the dragon fly are useful, there are numerous varieties which are distinctly harmful. Scientific observation and study are required to discover the dangerous varieties and the best methods of eliminating them. The egret, which is a great insect feeder, is now a preserved bird for this reason. As frogs and snipe are also great insect feeders the question is, should they also be preserved or at least protected? Frogs are not interfered with much but in Lower Burma, at least, snipe-shooting is a favourite pastime and thousands of these birds must be slaughtered every year. Bird and insect life in its relation to agriculture offers indeed a very wide field for investigation.

Well-known experts from other countries should be encouraged by Government to spend their holidays in this country with a view to carrying out experiments here. Probably the payment of passages and the granting of facilities here should be sufficient encouragement.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(*a*) to (*d*) In our opinion, demonstration work by means of model farms to be of any practical utility must not be confined to one or two places in the Province. For instance, there is a Government farm at Hmawbi; this is no doubt an excellent farm for experimental and research work but for demonstration purposes it serves only the cultivators in its immediate vicinity, *i.e.*, for a radius of five miles around. Cultivators from a greater distance may go there occasionally for seed grain but as a rule they cannot afford the time for observation. In our opinion what is required is a small Government farm of twenty-five to thirty acres in each village tract. We give this size because this is the usual size of a holding in Burma and cultivators

will find it easier to follow the development of a piece of land similar in size and character to their own. A careful account of expenditure and income from the land should be kept and made available to cultivators so that they can see at once the advantage of the methods employed on the Government farm over their own methods. The amount of money spent on the land must not ordinarily exceed the amount which a cultivator possessing a similar piece of land will be able to spend on his land.

QUESTION 4.—ADMINISTRATION.—(*c*) (*i*) In our opinion neither the Agricultural nor the Veterinary Department have done anything for the cultivators, for agricultural conditions remain to-day practically what they were fifty years ago and disease amongst animals is showing no signs of improvement. This is largely due not to inefficiency on the part of these two departments but to the deplorable lack of communications. During the wet or working season when the fields are under water, access to land for miles is rendered almost impossible, so that neither can a sick animal be removed to a veterinary hospital nor can a Veterinary Assistant visit the land without a great deal of difficulty. What is required is a network of narrow roads (not exceeding five feet) capable of being used during the wet season by cultivators and their cattle. These roads need not be too close to one another. What frequently happens now is that an Assistant from one of these departments goes to a particular village tract and instead of actually visiting the fields, sits in the *thugyi's* house and expects the cultivators to gather round him and listen to a discourse. In some cases these Assistants are not willing to take off their shoes and socks and wade through the water. They are thus prevented from seeing actual conditions.

(*ii*) Agriculture is at present very poorly served by either railways or steamers owing, very largely, to the want of roads and landing jetties.

(*iii*) Roads are notoriously few in Burma.

(*v*) The paucity in the number of post and telegraph offices in Burma is a very great handicap to the vast agriculturist population inasmuch as in the majority of places, telegraphic communication is non-existent and the postal service is most dilatory. For example, there are many villages which letters cannot reach in less than a week from a central town.

QUESTION 5.—FINANCE.—The great drawback at present in the system of Government loans is the formality which has got to be gone through and the delay which takes place before a loan is obtained by an agriculturist.

The pecuniary help given to cultivators by way of agricultural loans, though beneficial to some extent, is not adequate and extensive enough to satisfy the needs of the cultivators. Moreover, instalments are generally found to be too big for repayment. The township officers should be empowered to make loans without the necessity of any sanction by any higher authorities, though the loans may be large. The time for the distribution of agricultural loans should be as brief as possible.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—(*a*) (*i*) Poverty and inability to meet any sudden loss such as loss of cattle, damage to paddy cultivation and crops owing to floods in some places, droughts in others, and also the working of fisheries which either holds up water and causes floods to the fields or drains the fields too quickly, lead to considerable expenditure on the part of the cultivators so that they are obliged to borrow money at heavy interest. In places where the rainfall is inadequate for cultivation and no adequate provision is made to irrigate such areas, the cultivators suffer annually from a poor yield with the result that they have to borrow money to make both ends meet.

High prices of cattle, for instance, a pair of cattle which used to cost about Rs. 75 to Rs. 100 some twenty years ago, would now cost about Rs. 250 to Rs. 300, is another reason for borrowing on the part of the cultivators. This huge rise in the price of cattle is mainly due to the enormous slaughtering of cattle by the licensees.

(*ii*) The sources of credit to cultivators are very limited. There are really two main sources, namely, the Indian moneylender known as the *chettyar* and the Government which provides the agricultural loans. Co-operative banks also contribute some measure of pecuniary help to the agriculturist.

(*iii*) General poverty among the agriculturists, the high rate of interest charged by moneylenders, early sale of crops to pay the land revenue in March, which is done at a considerable loss, are some of the reasons which prevent repayment of loans. Destruction of first cultivation and paucity of crops owing to flood in some areas, and for want of adequate water-supply in others, are also serious handicaps to repayment.

(*b*) It is essential to enforce the application of Usurious Loans Act with more rigidity and more extensively, and steps should be taken to establish land mortgage banks to help agriculturists, to advance money on land security at a small rate of interest. Agricultural loans by the Government should be given more extensively and liberally and should be repayable in smaller instalments than hitherto. Greater encouragement should be given to co-operative societies.

QUESTION 7.—FRAGMENTATION OF HOLDINGS.—In Burma, the average holding in the case of paddy land is from twenty-five to thirty acres. In our opinion, this is a suitable size and subdivision into smaller plots is not desirable.

QUESTION 8.—IRRIGATION.—(*a*) (*i*) & (*ii*) It is an urgent need to irrigate, by perennial and non-perennial canals in some of the Upper Burma districts where agriculture suffers annually for want of rain, districts such as Yamethin, Meiktila, Myingyan, etc. Tanks, ponds and wells are also required in these places as the existing ones are too few to be of much service.

QUESTION 10.—FERTELISERS.—In our opinion, the use of expensive artificial manure is not suited for paddy cultivation in Burma where the manure is apt to be washed away after heavy rains. Natural fertilisers, such as cowdung, are, therefore, more profitable unless Government can show the people some simple and cheap method of preventing washaways.

QUESTION 11.—CROPS.—(*iii*) The distribution of seeds is a very important matter and there should be a centre for distribution in each village tract. The seed may be grown on the thirty-acre Government farms which we have suggested in our answer to Question 3 (*a*) to (*d*).

The various kinds of seed paddy which will produce grain marketable in foreign countries should be more extensively made known to the agriculturists in Burma.

QUESTION 12.—CULTIVATION.—(*i*) No. The present method is the most suitable for conditions in Burma, so far as paddy cultivation is concerned.

QUESTION 13.—CROP PROTECTION: INTERNAL AND EXTERNAL.—(i) There are hardly measures in existence for the protection of crops from internal and external infection, pests and diseases in Burma. Immediate steps should be taken to adopt effective measures for crop protection from such internal and external infection.

QUESTION 14.—IMPLEMENTS.—The existing implements used by the Burmese agriculturists are best adapted to the needs of this country and they afford an adequate amount of work to the labourers. The introduction of machinery to any appreciable extent will meet with opposition as the average cultivator finds it too complex and expensive for his work. It also ousts the manual labourer from his occupation. However, improved implements will become popular if there be adequate facilities for the cultivator to observe the advantage in the use of such implements.

QUESTION 15.—VETERINARY.—(*c*) So far as our experience goes, agriculturists in Burma derive very little benefit from the Veterinary Department. This may be due to two main reasons: (*i*) the absence of adequate veterinary provisions and (*ii*) the absence of proper communications.

QUESTION 16.—ANIMAL HUSBANDRY.—(*a*) Improving the breed of livestock should be encouraged by periodic cattle shows, exhibitions and competitions and the awarding of prizes. Lakhs of rupees are spent each year in Burma on horse and pony races. The Rangoon Turf Club have recently spent something like a crore of rupees on the creation of the new race course at Kyaikasan. Horse-racing is a Western institution and one of its supposed advantages is the improvement in the breed of

horses. This is all very well in countries like Europe and America where ploughing, and animal traction generally, is all done by horses. In the East, however, ploughing and animal traction are performed not by horses but by cattle and buffaloes. Out in the East these animals are of far more economic importance than horses. What is wanted therefore is to render substantial and extensive monetary encouragement by way of prizes and rewards at cattle shows and exhibitions, which should be held periodically.

It will probably be said at the very outset that horse-racing is carried out not by Government but by private clubs. This is perfectly true but no one will deny that this form to sport receives every encouragement and patronage from Government officials, even the very highest. Some of the stewards are Government officials. If a fraction of this official support and encouragement were extended to cattle-breeding there can be no doubt that it would go a long way to improve the breeding of livestock.

Better provision should also be made for grazing grounds. At present, not all villages have such grounds. One of the factors in the deterioration of cattle is the high cost of *bhoosi*. This is due almost entirely to the export trade which has grown up in this article. As compensation to the agriculturist, a reasonable export duty should be levied on this article and the proceeds diverted to some scheme for assisting agriculturists.

QUESTION 17.—AGRICULTURAL INDUSTRIES.—(*a*) The average cultivator in Lower Burma works really hard for about eight months in the year, from May to end of September, and again from December to end of February. In March and April he has little or nothing to do but this is the period for collecting supplies, such as ploughing implements, food, firewood, etc. Owing to the distances to be traversed and the poorness of communications this work takes time. In October and November he is engaged more or less in collecting grass for his cattle.

(*d*) Government might do more than it has done so far.

(*h*) Education and propaganda work by means of pamphlets in the vernacular and by means of travelling cinemas in the slack seasons.

QUESTION 18.—AGRICULTURAL LABOUR.—(*a*) The employment of labour agents, the granting of reduced fares and exemption from capitation taxes to labourers.

QUESTION 25.—WELFARE OF RURAL POPULATION.—(*a*) We think it would be in the interest of agriculture generally if the present policy of forcing the rural population to live only within the limits of villages were abandoned and cultivators were encouraged to live permanently on their own holdings. At present a cultivator under the Village Act may live on his holdings only during the working season. He then puts up a temporary hut to live in. Once his ordinary work on the land is done, he is compelled to shift into the village. The object of grouping the cultivators so close together has been to protect them from thieves and dacoits, but this danger is not so great as it was during the early days. There can be no doubt that if the cultivator were allowed to make his permanent house on his holding, he would not only save a certain amount of money but he would also have more time and inclination to introduce improvements on his land. Practically, the only cultivators who run the risk of being robbed are the richer cultivators or landowners. These men generally live in villages to safeguard their interests.

Another matter capable of improvement is the present division of fields into plots. At present there is no system or science in this at all. The plots depend upon the natural configuration of the land and are often less than a quarter of an acre in extent and highly irregular. This renders ploughing and reaping by any other than the crude method now employed impossible. In our opinion the plots should be about two acres in size, more or less, according to the locality. Cultivators should be encouraged to increase the size of their plots, if necessary, by giving them loans for building sufficiently high and straight *kazins*. It is only then that mechanical methods of ploughing or reaping can be introduced.

The status of the agriculturist is too low in Burma and should be enhanced by every possible encouragement on the part of Government.

Oral Evidence.

63167. *The Chairman:* U Paw Tun, you are a Barrister-at-Law in Rangoon?—Yes.

63168. Mr. Dumont, you are a Bachelor of Science of Edinburgh University and you are a resident of Rangoon?—Yes.

63169. U Khin Maung, you are a Member of the Legislative Assembly?—Yes.

63170. We have your joint note and the note * put up by Mr. Dumont. Would you first tell the Commission the circumstances in which you gentlemen were chosen to appear before the Commission?—(*U Paw Tun*) With regard to myself I must say that I have had experience in Lower Burma and Upper Burma as a Township Officer, and also as a Sub-Divisional Officer and Head Revenue Officer before I joined the legal profession. At a conference of landowners and agriculturists we had gone through the answers we submitted to you and we amplified and modified them to some extent. Secondly it was thought that Mr. Dumont, who has a certain amount of land which he cultivates himself, together with myself should give evidence before the Commission because the agriculturists being unacquainted with English would not be able to do so. Then again U Khin Maung who has also taken an active interest in cultivation has been included with us. This was decided at a meeting which was held for the purpose.

63171. How was the meeting constituted?—At first we held a preliminary meeting, at Pegu, of some of the leading landowners and agriculturists. At this meeting a provisional committee was formed to convene a conference of landowners and agriculturists in Rangoon, or some other place, which would consider some of the answers that might be given before the Commission. They thought that as the Commission was here advantage might be taken of its presence and some of their representatives might be asked to appear before it, to bring home to the members of the Commission what their needs were. A conference was therefore held on the 30th of last month at which representatives from various districts attended, and the proposition was put forward that some cultivators or landowners should be elected to represent the people before the Commission.

63172. To turn to the subject of your note: You gentlemen and your constituents think that there is room for further investigation into the problems of crop destruction by insect pests in Burma?—Yes.

63173. Would you give us one or two examples of damage to crops by insect pests in Burma?—A great deal of damage is caused by rats.

63174. But the rat is not an insect? Could you tell us about any insect pests?—(*Mr. Dumont*) There is a kind of black insect which attacks the paddy when it is growing. I made a kind of an experiment. I drove all the frogs into one field and they at once began to swallow the insects. I think there is need for investigation in this direction.

63175. Your point is a general one, I take it, namely, that you wish to encourage research in insects?—Yes.

63176. You give it as your opinion that "neither the Agricultural nor the Veterinary Department has done anything for the cultivators, for agricultural conditions remain to-day practically what they were fifty years ago." No doubt agricultural practice in the main remains in its ancient shape, but, may I ask you, have you studied with precision exactly what the Agricultural Department has achieved? It has not had a very long life in Burma but do you know what exactly it has achieved?—(*U Paw Tun*) What I do know is that the Agricultural Department has not directly given any help to the average cultivator on the field, that is to say, they have not encouraged the improvement of the soil, tillage and the produce. The chief help given is by way of seed supply through some of their farms. I am speaking from my own experience. When I was Sub-Divisional Officer of Yamethin, I found that the farm being at one end of the Yamethin township, the other end of the township received practically no help, but that only the people in the immediate vicinity were benefited by the farm. All I say is that the actual cultivator has derived no direct advantage of any substance from the Agricultural Department. They have not been roused to the fullest extent and general

* Not printed separately.

improvement has not advanced as much as it should have advanced. (*Mr. Dumont*) When I bought a piece of land about fifteen years ago my tenants were paying me eight baskets an acre. All round my locality they are paying now eight baskets per acre. This condition of affairs was exactly the same fifteen years ago, with the exception of my land because I am taking a personal interest in it. I myself get now about fifty to fifty-three baskets per acre.

63177. *Professor Gangulee:* As against eight baskets in other localities?—Yes.

63178. *Mr. Reynolds:* What do you say the others were getting?—Some get twenty baskets an acre, others twenty-five. Conditions about five miles away from my farm have remained exactly the same as they were fifteen years ago.

63179. *Mr. Kamat:* What was the value of the eight baskets in rupees?—The price would now be fifteen rupees.

63180. And fifteen years ago?—About eight and in some cases about twelve rupees. During the War time one basket of paddy was sold at the rate of one rupee. Now the price is double that.

63181. *The Chairman:* I think I am bound to take little notice of the statement that "neither the Agricultural nor the Veterinary Department has done anything for the cultivators." You will understand that it is not my duty either to assail or to defend the Agricultural Department, but I am concerned to see that the statements made are in accordance with facts and that they are fair. If you disagree with any of the claims which the Agricultural Department make (and which is admittedly an *ex parte* statement) you will no doubt let us hear about it. I will tell you what it is that they claim. They claim that two lakhs of acres of rice are under selected varieties distributed from their farms; they claim that the superior value of the rice distributed from these farms is now recognised both on the London and on the Continental markets; they claim that the rice is free from the objectionable red grain and of good quality generally; and they claim that premiums are paid both by large and small millers for the Agricultural Department seed, these premiums varying from five to fifteen rupees per hundred baskets of paddy. That after all, I dare say, is a modest achievement in Burma, but it shows at least that a start has been made. I wonder if any of you gentlemen are familiar with the work achieved by the department in the introduction of the immune variety of gram?—(*Mr. Dumont*) No. (*U Paw Tun*) In the sub-division in which I had worked previously there used to be a lot of gram cultivation and I think the Agricultural Department did give some immune variety of gram there.

63182. Do you know that in an important area of land, on which gram cultivation had ceased to exist owing to the attacks of fungus, an immune variety was evolved and that the whole of that tract was able again to grow gram as a result of that work? In a single year, 1923, enough seed of the immune variety was distributed for 28,000 acres. Then, the department is quite frank in the matter of cotton. They say that work on indigenous cotton has barely gone beyond the experimental stage. Cambodia seed has been distributed in suitable areas, and about 6,000 maunds of groundnuts. Are you familiar with the work which the department has done in the matter of groundnut?—No; we are familiar only with rice and gram.

63183. Do you know that the department, following on the lines of those who introduced the groundnut, are now successfully endeavouring still further to improve the type? No less an increase than fifteen per cent in the oil content is shown by the new type of groundnut. I think I may say that the appropriate attitude is to point out how small the achievements are when compared to the vast possibilities in Burma and not to discredit what has been done?—(*U Paw Tun*) In fairness I submit this: what we point out is that there is vast scope for the Agricultural Department to give facilities to the cultivators generally; that is the real sum and substance of the statement; we do not want to run down the department.

63184. Do you think that the time has come when the department ought to be extended and given further staff and generally supported by the population as a whole?—(*U Paw Tun*) Yes; quite so. In this connection I would submit that what we really wanted was that they should have more junior officers who would go out into the villages and explain things to the cultivators and educate them.

63185. That means more men available to the department and, inevitably, more money?—Yes.

63186. Do you think viewing the question from the public angle, that money well spent by the Agricultural Department will be a good investment?—Yes. (*Mr. Dumont*) What we want is more people who will take off their boots and walk into the paddy fields; some people do not want to go into the paddy fields. On account of lack of communications there is no road to walk into the paddy fields.

63187. I have been through the paddy fields myself; it is wet walking, is it not?—Yes.

63188. What view do you gentlemen take of the co-operative movement?—(*U Paw Tun*) The co-operative movement, so far as I know, has been doing a good deal of work; but in Upper Burma a greater amount of encouragement should be given to the societies. The movement is not flourishing in Upper Burma so well as in Lower Burma. I think it would be a great source of help to the agriculturists if Government encouraged these societies, and I think Government can still find some means to encourage the movement to a greater extent in the Upper Burma area.

63189. Do you think that the tax-payer in Burma should be called upon to finance agriculture?—The tax-payer in Burma is more or less the agriculturist. The greater portion of the Provincial revenue comes from the land-tax and the capitation-tax. The capitation-tax is also derived from the agricultural population. In other words, the tax-payer is bound up with the cultivator. Therefore, I do not think that, if the agriculturist is pushed up in any way, it will be at the expense of any other interest.

63190. What I am concerned with is to discover whether you think that it is the proper function of Government (and, in this matter, the tax-payer and the Government are the same thing) to finance agriculture from crop to crop?—I think it is.

63191. Would you like to see all the short-term money and the long-term money required by agriculturists throughout Burma provided by Government?—The major portion of it, I should say, ought to be given by Government.

63192. I think you will agree that the feasibility of a proposition of that kind would depend upon the amount required in relation to the borrowing power of the community and the taxable capacity of the public. What do you suppose it costs, from season to season, to finance agriculture in Burma? Have you thought of it?—(*Mr. Dumont*) Generally twenty to thirty rupees per acre.

63193. What is the cultivated acreage? Will you do the sum and see what it will cost?—It will cost about fifty-five rupees to get the maximum yield.

63194. How many acres do you estimate the total area cultivated to be?—I cannot say.

You have not made any attempt to bring this suggestion down to terms of rupees? I think you had better do so before you recommend it.

63195. Do you regard epidemics amongst cattle as involving very serious loss to the cultivator?—(*U Paw Tun*) That is a serious loss, especially because good cattle are rising in price, and the loss of a pair of cattle means a great deal to the average cultivator.

63196. Would you welcome any prudent step which might have the effect of mitigating the severity of those attacks of rinderpest which sweep the country? Would you regard that as an important contribution to the welfare of the cultivator?—Yes. (*Mr. Dumont*) That is important; but if there is no road to take the cattle to the dispensary, what is the use of having dispensaries? When there is heavy rain and rinderpest breaks out, the cultivator is not able to take his cattle to the dispensary. There must be at least a narrow road five feet wide; unless that is constructed, there is no advantage in improving the Veterinary Department.

63197. That emphasises the importance of improved communications in Burma?—Yes.

63198. In answer to Question 16, on the subject of fodder, you seem to attribute some part of the deterioration that you notice in the cattle to the export of *bhoosi*. Do you think the export of *bhoosi* puts money into the

cultivator's pocket by raising the value of the paddy? Have you thought of it from that point of view?—Some years ago *bhoosi* was about eight to ten annas a bag; now, I find it has gone up and the cultivator has to pay one rupee to one rupee eight annas a bag.

63199. What do you mean by *bhoosi*?—(*U Paw Tun*) It is bran. (*Mr. Dumont*) It is in powder form.

63200. Does not the sale of this *bhoosi* repay part of the value of the rice to those who buy?—Yes.

63201. Do you think that, if you stop your export of *bhoosi* or bran, the cultivator will get the same price for his paddy that he gets now?—When there is no export, the price of *bhoosi* will be cheaper.

63202. Are you, speaking in the interests of the cultivators, prepared to suggest that the export of *bhoosi* ought to be prevented in order that the cultivator may be able to buy *bhoosi* cheaper if he should want it as food for his cattle, although the prohibition of that export, while reducing the value of *bhoosi* to those who buy it might adversely affect the price obtained for his paddy by the cultivator? Do you not see that it cuts both ways?—(*U Paw Tun*) We do not want to stop all export of *bhoosi*.

63203. You cannot have it both ways; either you export or you do not; what is your practical sugggestion?—That a certain amount only should be exported; the export should be limited; there should be no wholesale export.

63204. So many tons annually to be exported; is that the idea?—Yes.

63205. You gentlemen have experience of these matters; do you really think that that it is a feasible policy for Government to adopt?—What we say is that if you levy a certain amount of money in this way, and the money is utilised for the benefit of the agriculturists, that might be all right.

63206. You want a special export tax on *bhoosi*?—Yes.

I think you are getting into rather deep fiscal waters.

63207. What view do you take of the experience of the past two years in the matter of local self-government in its bearing upon the welfare of the cultivator?—I think the local bodies are handicapped in many ways. First of all, the district councils, as far as I know, have not enough funds to improve communications which are necessary for the cultivator. There is also a certain amount of interference, undue interference I would say, on the part of Government with these district councils, and that question was raised some time ago in the Legislative Council itself. If they are allowed to have their own way and help themselves, that will be, I think, a direct help to the better foundation of those local bodies and also to the cultivators generally.

63208. Is it your opinion that local authorities in Burma show a readiness to tax their constituents for necessary services?—As far as that goes, I think they are prepared to tax to a reasonable extent, and not in the way Government want them to tax.

63209. May I put it in another way? Are you suggesting that Government, in part or in whole, should finance district councils from the Provincial revenues, or should the district councils stand on their own legs?—They should stand on their own legs, but Government should at this stage give them a certain amount of help, seeing that Government have handed over the local services to them in a bankrupt position.

63210. What do you mean by bankrupt position?—These district councils have not the money to utilise for bringing their schemes into operation. At this stage I submit that they require more money for carrying on the operations which have been placed in their charge.

63211. What constituency do you represent?—Yamethin North.

63212. Is that a rural or urban area?—Rural.

63213. Do you find that your constituents approach you on agricultural matters and ask you to make representations in the Council?—Yes. I might tell you one thing. I was talking of irrigation. In the sub-division in which I was Sub-Divisional Officer for over four years, there was a crying need for water. There used to be a drought every now and then, and Government decided to start a scheme called the Nankwe scheme. It has been in

abeyance and nothing has been done. If that scheme were completed, hundreds of acres could be brought under cultivation. That is one of the reasons why they want me to help their cause here also.

63214. Does the urban population, the intelligentsia, take an active interest in the welfare of the cultivator?—They are taking much more interest now than they used to about ten years ago.

63215. A wider horizon?—Yes, a wider horizon.

63216. Do you think discussions in the Assembly and the Provincial Council have helped to stimulate public interest in these matters?—Yes; I think they have to a considerable extent.

63217. *Sir James MacKenna:* Have you had much experience of Lower Burma?—I have worked in the Pegu and three other townships.

63218. There is a statement on the last page of your note about the agricultural disadvantages of *kazins*. Do these represent the views of your constituents, or are they your own?—They more or less represent the views of the agriculturists who were present at the conference.

63219. I imagine I have crossed as many paddy fields as anybody else in my career in Burma, and I am very much surprised to have that expression of opinion from the cultivators. In Lower Burma, that is the most remarkable feature of its agriculture. Whenever the cultivator has a slope, the cultivator arranges the *kazins* for his water-supply. I cannot agree with that opinion at all?—(*U Paw Tun*) What we submit is that if you want to introduce machinery, you can hardly do it with the present *kazins* or little *bunds*. If you want to have machinery introduced, the only thing to do is to make these plots bigger. That is the idea. As a matter of fact, we were advocating indigenous methods. At present the conditions are all right, but if you want to introduce machinery, it is impracticable. (*Mr. Dumont*) In a piece of land of 100 acres that I have got, I think the area of the *kazins* or *bunds* will be at least five acres. I mean, the width of the *bund* is not as it ought to be. It is all a plain surface.

63220. Where is your land?—(*Mr. Dumont*) It is in the Insein district. The *bund* is about five or six feet wide. What we do here is that we put *kazins* for two acres, and then we get more land for cultivation. That is the object of suggesting that if they make a survey of all these lands and develop the areas for big plots, and make these *bunds* smaller, we can collect more water, and the result will be more paddy. Now, the *bund* is exactly the same as it was ten years ago.

63221. On page 206 of your note you say "Agriculture is at present very poorly served by either the railways or by steamers." Have you any knowledge of the delta?—(*U Paw Tun*) I have not much experience of the delta, but I have been through some of the paddy lands in the delta, for instance, in the Maubin sub-division. What I submit is that if we had more roads the access to the steamers would be much more ready and easy, and the steamers would then be of still greater service. Of course, they are now undoubtedly giving a large amount of help.

63222. It is a question of more roads and jetties rather than of steamers?—Yes. (*Mr. Dumont*) If we want to take a cart-load of manure to another place, there is a big creek in front, and it cannot easily be done.

63223. You raise the point about the Burma Village Act, that each village should be of not less than ten houses. Do you think, as a Sub-Divisional Officer having a certain amount of experience, that you would have these scattered houses in your sub-division?—Personally speaking, I would not advocate it, but my friends want to advocate it, and so I have put it in.

63224. From the agricultural point of view, you are right?—Yes, but from the administrative point of view, it may not be convenient.

63225. *Professor Gangulee:* Mr. Dumont, you stated that in your farm you obtained a yield of rice fifty per cent more than in the neighbouring farms. What varieties of rice do you grow?—I get it from the Agricultural Department.

63226. Do you get a premium price for that rice?—No.

63227. How do you sell your paddy?—Brokers come to our fields and take it.

63228. You do not get any premium price for it?—I have been in Burma for the last fifteen years, and I came to know about this premium price

only three months ago, by reading some paper in one of the assistant's rooms.

63229. It is a great improvement that you get fifty per cent higher yield than the neighbouring farms. Have you yourself tried to get the neighbouring farmers to visit your farm?—Yes.

63230. Do you find that your improved farming has had any effect on the neighbouring cultivators' farms?—Yes, but on account of lack of funds they cannot do anything.

63231. As a result of your improved farming, do you notice any change in the neighbouring farms?—Yes.

63232. What are the changes?—Some of my neighbours are really following my methods.

63233. What was the precise method they adopted from you?—Manuring the land; they are also making the *bunds* for two acres of land; they also plough with modern ploughs; I bought the latest improved pattern plough from Jessop & Co., and they are following me.

63234. What varieties of rice do these farmers grow?—All exactly like mine.

63235. Where do they get their seed from?—I supply it to them.

63236. You supply improved varieties?—Yes.

63237. What is the yield of their fields?—It is twenty-five to thirty baskets per acre.

63238. How do you account for this difference, when they also grow improved varieties of paddy?—That is because they do not develop the land. They have got no manure and no *bunds*.

63239. Have you represented this matter to the Department of Agriculture at any time?—No. I have mentioned it to one of the agricultural assistants who inspects my place; he knows it.

63240. Does he inspect the neighbouring farms?—I do not know.

63241. *Sir James MacKenna:* Who are your cultivators?—Burmans.

63242. Why can they not make *kazins*?—I have the money and I have got perfect *kazins*. When I tell my neighbours to do so, they tell me that they have no money.

63243. *Professor Gangulee:* Are your labourers paid by wages?—Yes.

63244. You do not farm yourself; you parcel out your land to the tenants?—I am managing it myself. I have got a *maistri* and he is carrying on the work according to my instructions.

63245. Did you say that the actual cultivators working in your farm were Burmans?—Burmans and Indians mixed.

63246. How do you pay them? In cash or in kind?—In cash.

63247. How much do you pay?—Ten rupees per month, with food and clothing.

63248. U. Paw Tun, as a district officer, you are familiar with the rural areas. What is the primary need of the tract that you know of: education, better communications, or better agriculture?—Primary education is one; irrigation in some places, and protection against floods in Lower Burma.

63249. You say that primary education is one of the crying needs of the tract that you know of?—Yes.

63250. You have district councils in the tract?—Yes.

63251. What steps are they taking to satisfy this crying need?—As I said a little while ago, the district councils have got vernacular schools under them. They are being run more or less by the Education Department. Although they give monetary help to them, they have practically no control over them. In fact, their hands are tied, and they carry on on the same old method. What we want is to give the villagers vernacular education on the most modern lines, and also to bring in agriculture as a subject of the curriculum, so that the people in agricultural areas will know something about the utility and methods of improved agriculture.

63252. Have you a district school board in the area that you are speaking of?—As far as I know, we have got township boards. I do not know about district school boards.

63253. Who settles the matter of the curriculum?—The Education Department.

63254. Your suggestion is that you have no independent voice?—Yes.

63255. In answer to the Chairman on the question of the Local Self-Government Act of 1921, you stated that there was undue interference from the Government. Would you explain what is the nature of the interference?—For instance, if the district council wants to start a road along a certain tract, and they say that they want to have the road in a particular way, Government comes along and says that, in the opinion of its experts, the road is not necessary; or the chairman of the district board wants to carry on a certain operation; he gets a letter from the Deputy Commissioner or the Commissioner saying he should not start that operation.

63256. But road-making is a technical subject?—Yes, I know; but, at the same time, the agricultural people know that this road will help the agriculturist in carrying his produce and in other ways; but the district officers, unless they are sympathetic and unless they study the problems of the people on the spot, do not know the actual needs of the people. There are very few officers in my experience who go about the villages in order to learn the real needs of the people. What we want is more sympathetic officers who will go about, see what the real needs of the people are and study them on the spot, rather than stay at headquarters.

63257. I follow you, but I wanted to know from you some definite instances of undue interference with these local bodies by the Government?—As I told you, when a district body wants to start a certain road, they are stopped.

63258. They naturally send the proposal to the expert?—Yes, and the expert says the road is not necessary or it is too expensive. But the expert stays in the headquarters of the district; he does not go about in the villages to find out how much help would be derived by the cultivators or the masses from that road. All he knows is the cost of that road and technical matters.

63259. Can you give me any other instances?—With regard to the school, if they want to change the teacher, want a certain thing introduced in the school or a certain amount of money to be spent, the answer is: "the change is not expedient and the expenditure is too great; you must not spend so much on educational schemes."

63260. So much for district councils; then you have your circle boards?—Yes.

63261. Are you familiar with the working of those boards?—I do not know much about circle boards.

63262. Then you have village committees?—Yes.

63263. Could you tell us something about those committees?—Village committees are of very little help. What has happened since the introduction of the Reforms is that the village community and the headman are isolated more or less. Then there is generally a party in the village which is more or less against the village committee.

63264. Then what do you suggest?—What I would say is that the local self-governing bodies should be left to themselves to experiment and to learn lessons by themselves, rather than be unduly interfered with at this stage when they are learning and apt to make mistakes. The control of the Government should be lessened.

63265. You do not like to see the local self-governing bodies spoon-fed by the Government?—Quite so.

63266. But you want money from the Government?—Yes, but the money is the people's money; they are entitled to a certain amount of help from the Government because the people are the tax-payers and the people are willing to help these bodies if the money goes in the right direction. Instead of spending money on magnificent buildings and other things in bigger centres, if that money were used by the district bodies in developing the district, I am sure the average cultivator or the cultivator *en masse* would have no objection.

63267. Do you think the district boards are interested in primary education?—I do not think they are educated enough to realise the value of compulsory education; what they want is education in the vernacular and they want a certain amount of training in agriculture introduced into the schools.

63268. Have you yourself studied this question of compulsory free education?—Yes, I was a schoolmaster for seven years and I have taken a lot

of interest in school affairs. I will give you one instance. My son, who is in the first standard in a big school here, has to study geography and history and also the catechism.

63269. That is a good thing?—Yes, but he has got to cram all these subjects. We should like to see a certain amount of change so that the curriculum may be adapted to the needs of Burmese boys.

63270. You want to change the curriculum?—Yes. Also in the vernacular schools, as I have said, we have very poorly paid teachers generally. I will give you an instance of what I mean. In teaching Burmese grammar, certain stereotyped questions and answers and illustrations are given in the grammar. The teacher confines himself to that sort of thing rather than attempt to draw out the faculties of the boys. We want teachers of better type who will be able to understand the problems of the people and help the people. At the same time we want the Education Department to devise a curriculum which will help the people of the country and not consist merely of Western methods translated.

63271. Have you interested yourself in the co-operative movement?—To some extent.

63272. What is the present state of the co-operative movement in Burma, do you know?—As far as I can find out, it is not so active as it was some five years ago.

63273. Why?—As I say, at one time there was a lot of propaganda work and people were more or less educated by that means; but somehow or other the educational propaganda has been considerably reduced as far as I can find out.

63274. Is the educational propaganda work, to which you refer, carried on by non-official or official agencies?—As far as I know, by official agencies and to a certain extent by non-official agencies; but now that propaganda is more or less at a standstill.

63275. Are you satisfied that the co-operative movement received the necessary support and assistance from the non-official agencies?—They are receiving a certain amount of support but not sufficient; that is chiefly because they do not understand as much as they should. We want more Burmese people who will be able to explain things sympathetically.

63276. That is what I wanted to ask you about. Have the educated people, the so-called intelligentsia, taken an interest in the co-operative movement?—As I say, they have not taken as much interest as they ought; you see, at present, their minds are diverted into different channels.

63277. What are the different channels?—We have the district councils, district boards, circle boards and then the Reforms; and there are difficulties which exist even in the bigger towns. We will take, for instance, Pegu; there the intelligentsia are more or less poor people; they are not well-to-do people who can devote time to the advancement of the people.

63278. *Sir James MacKenna:* Have you any intelligentsia in Burma?—I suppose we have, like every other country; they are not all duffers, anyhow.

63279. *Professor Gangulee:* You told Sir James MacKenna that you are familiar with the Lower Burma conditions?—Yes, to some extent.

63280. We are told the standard of living of the Lower Burma population has risen considerably during the last few years; do you agree with that statement?—I do not think it has advanced so much as to make any significant difference as compared with what it was some ten or fifteen years ago. The difference is that the commodities and material things are very much more costly than they used to be.

63281. They are consuming more condensed milk than they ever did?—I do not think that is quite true; most of the people have not the means to buy condensed milk. The consumption of condensed milk is confined more or less to big towns; it is not in the villages. People who do not go into the villages and see the conditions there take a superficial view of the matter and go upon that. That does not really represent the conditions of the people. The people in the villages, where agriculture is carried on, live in the same old fashion. They live on *ngapi* (pressed fish), raw vegetables and rice.

63282. Do you see any change in the diet of the Burman people?—Very little; if you go into their houses you see very little.

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63283. Is there any change in their dress?—Their dress is just the same as before. Sometimes in the big towns they send boys to schools in silks and satins, but that is a very small number compared with the whole mass. In the interior you will see hardly any change. If you take one township about six or seven miles from Pegu, called Thanatpin township, if you go through the length and breadth of that neighbourhood you find villages cut off from the main centre by little creeks and the people very seldom go out of their rural areas. They have not changed to any appreciable extent, either in their dress or mode of living.

63284. Has the export of rice from this country increased?—I could not tell you.

63285. You say the price of cattle has gone up very much?—Yes.

63286. How do you account for that?—There are a huge number of what we call slaughter-house licences issued year after year. They are increasing in number. More money is given by way of licence fees by the auction purchasers. These people slaughter a large number of cattle. That is one reason why the number of cattle has decreased. Another factor is cattle disease. If rinderpest breaks out you have only one Veterinary Assistant for a whole township and he is not able to cope with a rinderpest outbreak to any extent. If he is in one quarter, the rest of the area suffers. As a result, there are many deaths from such disease. The village headman reports to the Township Officer, who sends for the Veterinary Assistant. While the Veterinary Assistant is away on tour, there is nobody to look after epidemics.

63287. You think the increase in the price of cattle is due to slaughter-house licences and cattle diseases?—Yes; and we also find that the Indian gentlemen who breed cattle keep large herds; the result is that they cannot look after the cattle as well as they could if there were a smaller number. They bring a number of cattle from Upper Burma and bring them down here to breed; that also has helped to increase the price of good plough cattle.

63288. Are you familiar with the student community of Rangoon?—To some extent, yes.

63289. And of Burma generally?—To some extent.

63290. Do you think there is a demand for agricultural higher education?—I think there is, but the scope for employment of these educated men is very small, so that it is not very attractive.

63291. Have you yourself paid a visit to Mandalay Agricultural College?—No, I have not.

63292. *Mr. Kamat:* As a member of the local Council, I dare say you have given attention in some detail to the question of the road policy of the Burma Government?—Yes, to some extent.

63293. With reference to your illustration of interference in the construction of a road, you are getting certain contributions from Provincial revenues towards your roads, are you not?—Yes.

63294. Have you any idea to what extent Government contributes towards district roads?—I could not tell you the exact amount they contribute to each district.

63295. You may not be in possession of the facts. Now, I hold no brief for or against the Local Government, but I think it is better that you should be in possession of the facts. There are 6,000 miles of Provincial roads and 4,000 miles of district roads in your Province. The estimated cost of maintaining these 4,000 miles of district roads at their present standard, including an allowance of twenty-four per cent for establishment, tools, etc., is twenty-seven and three-quarter lakhs of rupees, and the Local Government contributes seventeen lakhs out of that amount?—Admitting all that, I will give you a practical illustration. Take the Pegu district itself. We have very few big roads. So far as I can think at present there are three roads, one leading to Thanatpin, and two to pagodas, and there is a trunk road. Beyond these to help the agriculturist population I do not see any other important road. What I mean is that when they spend all this money their attention is more or less confined to facilitating communications to the district headquarters and the neighbourhood. What I suggest is that there should be roads which reach the interior.

63296. What I am trying to point out is that the Provincial revenue is not the Local Government's private money. It is the tax-payers' money. Out of the tax-payers' money local rates are receiving seventeen lakhs out of twenty-seven lakhs. Do you not think that this is a fair allocation and, in the second place, do you think there should be no interference with the manner in which this money is spent by the district council?—I do not mean that at all. My point is that it is not utilised in the right way. They should be allowed a free hand in making their own roads. When the district council decides that a certain road should be opened, they should be allowed to go on with it instead of being dictated to. They should not be told: "You cannot open a road here, you must open a road there," and so on.

63297. I am not quite sure whether you are aware of another fact, namely, that the average annual capital expenditure on new roads in districts has been seven lakhs. There again you are getting a contribution?—I do not think I have made myself clear. We are getting contributions right enough. My point is that we are not allowed to use the money in the way in which we want to use it. That is a disadvantage. May I just ask how many new roads Government has opened in the five years after the Reforms or in the last twenty years? There has hardly been any new road. The old roads have not received much attention. They are still in the same condition.

63298. I do not want to go into too many of these details, but you have been opening up rather new questions. In 1922, after the War, there was a scheme in your Province by which out of the rice profits a sum of two crores and forty-five lakhs should be earmarked from Provincial revenues? Are you aware of that?—I have heard of that myself.

63299. And since then they have appointed a Communications Board and certain projects have been approved by it since 1924. This Board has considered 241 projects and has approved of works estimated to cost four crores and sixty-seven lakhs and the annual expenditure during the last four years is forty-three lakhs for original works and forty-three lakhs for repairs. That is concerned with the scheme for spending rice profits on communications. Now what you have to make out is that this is inadequate, so far as Provincial roads are concerned and that these contributions to district councils should be absolutely unconditional?—My point is that the pecuniary help to the district board is inadequate. Secondly, I said that they should be allowed to utilise the money to improve the condition of the roads in their own districts and that expert help should be given but that it should not interfere with us unduly. I do not suggest that there should be no control of any kind. A resolution was moved in the local council that local bodies were being unduly interfered with by the Government and instances were given.

63300. I am absolutely with you if you say that the interference should be the minimum but I wish to put to you this point: Supposing you want a road from one particular point to another and you want a particular alignment, and the Government acting on the advice of its Public Works Department experts comes to the conclusion that your alignment is not suitable, do you not think that the money in that case would be wasted?—One has to be quite sure that the money is really going to be wasted. You should not entirely depend on the advice of the expert. From my own experience I have found that the expert gives his advice in a casual way and it is sometimes acted upon. That is my grievance.

63301. In other words, the expert, according to you, is not an expert?—There are good experts and bad. Once has to take into consideration all the factors connected with a particular case. The matter should not rest with the expert alone. The Deputy Commissioner of the district concerned should also look into the matter personally and find out what is the proper thing to do.

63302. You were asked a question as to how far the intelligentsia have co-operated in the matter of helping forward the co-operative movement. In reply you said that to a certain extent they do. Do you know of any particular towns in Burma whether educated men take a steady and continuous interest in the co-operative institutions?—In Pegu, for instance, they take a good deal of interest. Bassein is another. As far as I know, in the Meiktila district a considerable amount of interest is taken.

63303. In Rangoon for instance, are there a number of people among the educated men who make it their business to devote their spare time to helping their countrymen in this matter?—There are an appreciable number of people who do that.

63304. Speaking as one who has had some connection with the co-operative movement, I do not wish to be discouraged by the small interest that is being taken. What I am asking you is whether, from your knowledge of the interest taken in this matter, you consider that the future is hopeful?—I think there is a hopeful future.

63305. And if a certain number of men are coming forward to sacrifice their time and energy, are they receiving a fair amount of recognition from officers of the department?—I must say that the Co-operative Department has adopted a very sympathetic attitude towards those who are interested in the movement. That is the one department which has, so far as I am aware, given some recognition to the people who help.

63306. My only point is this: Although this Province may not be expected, at the present stage, to reach the same level of efficiency as, for example, the Punjab, still if there is an element of help being offered, is that help being adequately recognised by the Government?—I think it is.

63307. Can you suggest any method by which more and more educated men could be enlisted in this work?—My suggestion is this. Whenever they hold a conference of their own to discuss matters, they should make a point of inviting people outside their field of work, who, they know, are taking interest generally in matters connected with the co-operative movement. I know there are people who take an interest in these matters and they are sensitive enough not to attend these conferences unless they are invited. I find that very often that is the case. So, my definite suggestion is all people who are interesting themselves in co-operation should be invited to attend these conferences and discussions.

63308. Let me ask you bluntly if the Registrar seeks every avenue of finding new recruits, although they might be lukewarm in their interest and defective in other ways, or does he merely content himself with criticising the intelligentsia?—I do not think he does that. I think he seeks all the available recruits in the right way. That is my impression from what I have seen. The Registrars, so far, have been men who have taken a very active interest in the people. Men like Mr. English, Mr. Dunn, the present Registrar, and Mr. Steavenson whom I personally know, have all taken a very keen interest in their work, which has been appreciated by the masses. They have sought recruits in the right way.

63309. Have they taken their recruits from any particular profession or grade of society?—Yes.

63310. *Sir Thomas Middleton:* You attach great importance to demonstration farms?—Yes.

63311. You suggest a farm of about twenty-five to thirty acres in every village tract?—Yes.

63312. How big is the village tract?—A village tract consists of three or four villages, consisting of about 500 to 1,000 people. In some villages there are 200 households. But an average village tract consists of about two hamlets or more. So many villages constitute a village tract. We have them scattered all over. (*Mr. Dumont*) The village is surrounded by paddy land up to a radius of four miles; the village is in the centre and for four miles around there are paddy fields.

63313. How many such village tracts are there in Burma?—(*Mr. Reynolds*) That information has been published.

63314. What I was getting at is, how many demonstration farms your suggestion is going to mean for Burma?—(*Mr. Dumont*) There need not be any farms introduced; the people may become tenants of a landlord and then the experiments may be shown on such land.

63315. But you have got to have a man in charge and some kind of an account of the expenditure and income must be maintained?—Suppose they spend something like four thousand rupees and they only get three thousand; what is the use if that is the case. They should show the other people that they can secure some profit.

63316. Your assumption is that if we had this system of farms you would make some profit and no cost would be involved to the country?—My submission is that the experimental farms are very far off and nobody will take the trouble to go all the way to the farms to see the experiments conducted.

63317. I quite see the desirability of these experiments, but I am asking myself whether you have given any thought to the cost?—As I said, no special farms need be opened.

63318. *The Chairman:* How many tracts would there be of that sort?—(*Mr. Reynolds*) Speaking from memory, say, about 10,000 to 15,000. (*Mr. Dumont*) Three cultivators may be put on to plough the land in each place and the departmental officers can go and inspect the work. (*U Paw Tun*) In connection with that I might submit that in some cases we have got *thugyiza* lands which are given to the headman to cultivate. From time to time these lands may be experimented with by experts in order to give the villagers an idea of what is really needed and, as the headman already keeps other statistics, he might also keep a rough kind of account of what is being done here. That should give one an idea of the extra expenditure entailed. In some cases small areas might be put under the charge of a headman.

63319. *Sir Thomas Middleton:* Would the working capital that would be required be advanced by the Government? If you are cultivating twenty or thirty acres of land there must be some ready money available?—(*Mr. Dumont*) They need not buy land; they can take up another man's land and experiment on this land in order to show the results to the people.

63320. But the other man would certainly want some compensation, would he not?—He may receive paddy by way of compensation.

63321. On another point: You attribute the main rise in the price of cattle to the increase in slaughtering. Are there any figures available which would enable us to estimate the possible effect of slaughtering on cattle prices?—(*U Paw Tun*) We have not got any actual figures, but we gather this merely from our practical experience.

63322. Is it not the case that the butchers pay a lower price generally than the prices paid to sellers of cattle by the cultivator?—Generally they do, but what happens is this: The cultivator buys periodically, and when he goes to buy the supply is drained away; when the cattle traders want to sell their cattle they do not wait for the cultivators to come round at the end of the season to buy the cattle, but simply sell them off as quickly as possible.

63323. But the dealer would not sell off all his cattle rapidly if he expects to get more out of the cultivator?—That is just the difficulty here; the Burman wants ready cash and he is keen on selling off at once.

63324. *Mr. Calvert:* When are cattle most valuable: when alive or dead?—Alive.

63325. Then what is your argument?—My argument is that if you drain the supply of cattle to any great extent you lessen the number of the cattle; and so the cultivator pays a huge price for his cattle.

63326. *Sir Thomas Middleton:* You complain of Rs. 250 being an exorbitant price for a pair of good working bullocks?—Yes.

63327. Have you asked yourself whether the man who raises the cattle and gets Rs. 250 for them makes as good a profit as the man who buys and grows paddy? Which is the most profitable kind of farm operation in Burma?—The agricultural operation is much more profitable.

63328. Does that not point to the fact that if the Lower Burman cultivator wants to get a good supply of cattle he ought to raise the prices that he pays to the cattle-breeder?—The point is whether he can afford to pay such high prices.

63329. He must afford it if he wants to be successful. I see that you take the view that Burma is such an attractive holiday resort that you think you could get quite a number of experts to come over here if their expenses only were paid, in order to study conditions here. What put that idea into your mind?—(*Mr. Dumont*) My idea was that an officer working in London might be given a first-class passage and asked to come to Burma and study the conditions. This would stimulate interest a great deal.

63330. But you must know that he would have to come here when the paddy is on the ground, and, to study paddy, you tell us a man should put off his shoes and socks and wade. Do you think that would be a pleasant holiday?—Some one must take an interest in the work.

63331. I am afraid you are a little optimistic there. You say in your last sentence with which everyone will agree that every possible encouragement should be given to the agriculturist so that his status may be raised. Have you any definite suggestions to make other than those already put forward by you?—(*U Paw Tun*) I might give just one instance. The subsistence allowance given to a trader to attend court is much more than that which is given to a cultivator. The latter is given only six annas, whereas the former (the trader) gets one rupee. My suggestion is that both should be put on the same footing.

63332. *Dr. Hyder:* One of you gentlemen is in favour of the exemption of labourers from the payment of the capitation-tax. Are you acquainted with the provisions of the Burma Rural Self-Government Act of 1921?—(*U Paw Tun*) Yes.

63333. Have not your district councils got the option, under the provisions of that Act, to convert the capitation-tax into a tax on circumstances and property?—The levying of the capitation-tax is confined to the district and the Deputy Commissioner is the collector.

63334. I want to know whether, under the provisions of the Burma Rural Self-Government Act of 1921, local bodies have been given the option of converting this tax into a tax on circumstances and property?—Yes, but we are now talking of exemption from the tax.

63335. Very well. If your district councils were to do that, do you not think your labourers would enjoy exemption?—I do not think that they would.

63336. But that would be a tax on circumstances and property; it would not be a capitation-tax?—But the local bodies have no power to exempt one from the capitation or the *thathameda* tax.

63337. I am asking you whether local bodies have the power, under the existing law, to convert the tax into one on circumstances and property?—Yes; they might introduce something else other than the capitation-tax. Our contention is that those people who move from Upper Burma to Lower Burma are very poor people. I do not think that they can afford to pay Rs. 5 per couple or Rs. 2-8 each. They should be given exemption.

63338. If the district councils were to levy a tax based on circumstances and property, then your poor man would not have to pay, would he?—No.

63339. Have your district councils in Burma converted this tax into one on circumstances and property?—No, because the Government is opposed to it.

63340. Do you know if the provisions of this Act apply to Burma?—Yes. We have also moved the Government to do away with the *thathameda* and capitation taxes. There was an inquiry committee in this connection and this committee suggested that these taxes should remain. That in itself indicates that the Government are bent upon continuing this tax. I suggest that if the Government only showed themselves ready to retrench their expenditure to some extent in various other ways and also, as we suggested, to secure the duty on rice and petroleum for this country, those other taxes would soon go.

63341. Would you advise the local bodies to take advantage of this option given under the provisions of the Act of 1921 to convert the capitation-tax into a tax based on circumstances and property?—Yes, I would.

63342. You do not at present know the provisions of that tax?—No.

63343. Mr. Dumont, you are in favour of the French system under which the agriculturist gets a loan without any formality and without any delay, at the rate of nine per cent per annum. This is in force in Pondicherry?—Yes.

63344. Have you any actual knowledge of this system?—Yes.

63345. Do you mean to say that the French system is devoid of any formality?—What I mean to say is that the poorer class of people simply have to go to the treasury bank and take some jewels worth, say, about Rs. 500 and they at once get cash.

63346. That is quite a different matter. You have a different system here, and you go to a *chetty* if you want any more. Surely you would not think of turning the Government of Burma into a pawn shop, would you?—Something must be done to lend money to the cultivators.

63347. But if you know the system there, apart from the pawn shop aspect of the matter, I was wondering whether you could make any suggestion with regard to the elimination of delay and formality?—They tell me that they could get some money very quickly, simply by pawning their jewellery, and this is done without any formality or delay whatsoever.

63348. *Mr. Reynolds:* You know that the great majority of the cattle brought down to Lower Burma are brought from the dry zones of Upper Burma?—(*U Paw Tun*) Yes.

63349. And they are mostly bred by cultivators of very moderate means?—Yes.

63350. But you object to the cultivator, when he has got the bullock down to Lower Burma, getting the full market price?—My point is not that. I am sorry I am misunderstood. My impression is this, that an average cultivator here is not in a position at present to pay that huge price because it absorbs a great portion of his money, thereby leaving him with too small a balance to meet other expenses. That is why the difficulty arises.

63351. The difficulty arises equally on the other side; if the Upper Burma cultivator cannot afford to part with his bullock under that price, it will be equally difficult?—That is true; but the Government need not issue licenses for slaughtering them.

63352. I think you may take it that no valuable plough bullock gets slaughtered?—I might disagree with the Government official in regard to that.

63353. Mr. Dumont, you mentioned that you wanted to see Government financing most of the agricultural operations. There was some discussion as to the amount that would be required. You work some land?—(*Mr. Dumont*) Yes.

63354. With tenants?—No; myself.

63355. Are you acquainted with Burman tenants or landowners working land in the vicinity of yours?—Yes.

63356. Most of them have to take seasonal loans for the purposes of cultivation; most of them have to borrow a certain sum each year at the beginning of the cultivating season?—Yes.

63357. Have you any idea as to the average loan taken up by a cultivator each year in your part of the country?—No.

63358. You do not know?—I do not know; I have not asked them. They are taking loans, but I do not know what amount they are taking.

63359. Will it be a hundred or two hundred rupees?—It depends upon the number of acres he cultivates.

63360. Say, a man cultivating twenty-five acres?—He might be taking about Rs. 300 or Rs. 400.

63361. As much as that?—Yes.

63362. And he would repay that at the end of the year if it was a good season and borrow again next year?—Yes.

63363. So that, if Government were to finance the greater part of the loans required in Burma, in Lower Burma they might have to find Rs. 200 to Rs. 300 for each person working a holding of twenty or twenty-five acres?—To some extent.

63364. There is just one more small question; it is not important, and if you had not differentiated so strongly between frogs and snipe I should not have asked you. You say that frogs are not interfered with much. Would you be surprised that I have seen a whole population hunting for frogs and killing them?—(*Mr. Dumont*) There are two kinds of frogs; one kind they eat, the other kind they do not.

63365. You are referring to the frogs they do not eat?—Yes.

63366. Are you aware that a very large number of snipe are caught by netting them?—Yes.

63367. *Professor Gangulee:* Is litigation on the increase or on the decrease?—(*U Paw Tun*) Litigation is, I think, on the increase.

63368. How do you account for that when you maintain that the standard of living is much too low?—I do not say that the standard of living is low, but poverty is more prevalent.

63369. Do you know of cases where cultivators have got into debt through litigation?—I could not attribute that to litigation. What I say is that indebtedness is the cause of litigation. Because they do not repay in time they are dragged to the courts. When the small tenants take money on promissory notes, they are not able to pay (in Lower Burma owing to floods, in Upper Burma owing to drought) and they are dragged to the courts. Poverty is becoming more and more prevalent in the country, and in that way the smaller cultivators and the tenants have a good deal of litigation.

63370. So in your view litigation is due to poverty?—Want is one of the reasons.

63371. Is meat consumption increasing in the country?—I think the consumption must be increasing, as I find that they are paying a larger amount by way of license fees for slaughter-houses. But I cannot say definitely; I have not considered that point.

63372. Is there any export of meat from this Province?—No.

63373. Mr. Dumont, have you recently got a pair of bullocks for your farm?—(*Mr. Dumont*) Yes.

63374. What price did you pay?—I paid Rs. 275.

(The witnesses withdrew.)

The Commission then adjourned till 11-45 *a.m. on Monday, the 7th November,* 1927.

Monday, November 7th, 1927.

RANGOON.

PRESENT:

The MARQUESS OF LINLITHGOW, D.L. (*Chairman*).

Sir THOMAS MIDDLETON, K.B.E., C.B.
Mr. H. CALVERT, C.I.E., I.C.S.
Professor N. GANGULEE.
Dr. L. K. HYDER.
Mr. B. S. KAMAT.
Mr. H. O. REYNOLDS, I.C.S.
U BA CHO.
(*Co-opted Members*).
Mr. J. A. MADAN, I.C.S.
Mr. F. W. H. SMITH.
(*Joint Secretaries*).

Mr. E. L. EDWARDS of Messrs. Steel Brothers & Co., Limited, Rangoon.

Replies to the Questionnaire.

QUESTION 20.—MARKETING.—(*a*) I consider the existing facilities for marketing paddy are satisfactory.

(*b*) The early paddies in Lower Burma begin to come on the market in small quantities from the end of November, and more than half the crop is sold and brought into the ports by the end of April.

The usual method of marketing paddy is as follows:—In the districts, there are small jungle brokers who keep in touch with the paddy-sellers. These jungle brokers live permanently in the districts, and the traders and brokers from the milling centres employ these small jungle brokers for making contracts with the paddy-sellers.

At the time of making the contract, the following particulars are arranged:—

(1) Earnest money.

(2) Time within which the balance of the cost of the paddy must be paid.

(3) Time within which the delivery must be taken.

(4) The basket by which the paddy is to be measured.

For his services, the jungle broker is paid a commission of Re. 1 to Rs. 2 per hundred baskets of paddy. Traders and brokers bring this paddy into Rangoon for sale to the mills at the market rate.

Occasionally the mills make contracts with their traders and brokers to bring in definite quantities of grain at a fixed price. Prices per hundred baskets in the jungle are invariably much higher than in Rangoon because the basket (the unit of measurement) in the jungle is much larger than the basket used at the mills. The basket at the mills is a nine-gallon basket and this should contain from 47 to 51 lb. of clean paddy.

In the districts baskets contain from 47 to 60 lb. * In calculating the Rangoon equivalent of district rates, the weight of the basket *plus* cost of transport and expenses have to be taken into account.

At Rangoon mills, almost all the brokers are traders as well, but apart from their trading risk they receive brokerage calculated per hundred baskets measured.

* *See* Question 63378.

The paddy is measured in the standard basket, which is a cylindrical measure 15 inches by 14½ inches and the basic weight for this is taken as 46 lb. For every pound in excess of 46 pounds 2½ baskets per cent is added to the total number of baskets measured. Paddy is not always well winnowed and it is often adulterated by unscrupulous traders by the addition of dust or dead grain. This adulteration is combated at the mills by cutting weight.

In the western districts the different sizes of baskets are calculated according to the number of condensed milk tins the content of which they will hold. In the eastern districts the *lichi* tin is used, which is twice the size of the milk tin.

Freight and transport.—From the fields the paddy is taken to the railway station, river bank or local district mills by cart. It is carried in bulk and the carts are lined with mats. In some districts, Kayan, Thongwa, and Petye, motor transport is used in the dry weather. By rail the paddy as a rule has to be put in gunnies, as it is mostly carried in open trucks. In closed trucks seventy per cent is in bulk and thirty per cent in bags in each truck.

By boat, the grain is brought in in bulk. Transport by water consists of Burmese boats, Paddy gigs, iron barges towed by launches, and barges propelled by either motor or steam engines.

At all the mills the paddy is measured in the boat and carried ashore by coolies, each load being the contents of one nine-gallon basket.

Premiums for paddy.—Paddy is not all bought at the same rate, different rates being paid for different varieties. The principal varieties are Ngatsaing, Meedoung, Koukyee, Emata and Koukhnyin. Prices for these grains vary according to the market rate of the rice therefrom. Mills are always required to pay a premium for selected white grain, especially for the grain grown from seed supplied by the Agricultural Department. This premium may vary from Rs. 5 to Rs. 20 over the market price for ordinary grain.

(*c*) The quality of Burma paddy can be improved to a very great extent. Very good work is being done by the Agricultural Department, and centres for the distribution of seed should be opened all over the paddy districts.

(*d*) I consider that cultivators, merchants and traders obtain very full information as to market conditions, both local and export. The crop returns as published by Government, in my opinion, are very accurate.

Mr. J. J. NELSON of Messrs. Steel Brothers & Co., Limited, Rangoon.

Replies to the Questionnaire.

QUESTION 20.—MARKETING.—(*a*) *&* (*b*) *Cotton.*—The system of marketing at present in force in most districts of Burma where *kapas* is grown is as follows:—

In the first place the cultivator usually has to hand over a portion of his crop against money borrowed to meet his expenditure during the growing season; in other cases seed given on credit is repayable in *kapas* at a fixed rate usually very much in favour of the creditor.

The balance of the cultivator's crop is usually sold to jungle traders on the spot, who pay cash for their purchases. The traders in their turn bring these purchases into the consuming centres where the *kapas* is bought by the various ginning factories through brokers. In most cases these traders are merely acting as jungle buying agents for the factories through the brokers employed by the latter, in which case they receive money in advance with which to make such purchases. There are, however,

a number of independent traders working with their own or borrowed capital. The broker employed by the factory receives brokerage and bonus in return for his services which is usually shared in most cases with the jungle trader working under him. The independent trader, on the other hand, has to rely on the profit he makes out of his jungle purchases either by obtaining excess weight or selling in a favourable market. When the latter goes against him he as often as not resorts to malpractices, such as watering, mixing of inferior quality, etc.

Under the present system it can be said that the cultivator is getting the full current market value for that portion of his crop that is left after paying off his debts, with the possible exception of cases where the trader gets the better of him over weights.

At present *kapas* is weighed in the jungle by a stone weight which varies slightly in size and weight in practically every village. An improvement in this direction, however, is hardly possible until weights and measures have been standardised by Government.

(*c*) There is at present no organised system of cotton seed distribution for sowing purpose that ensures only selected seed being sold to cultivators.

The existing system is for cultivators to buy their requirements direct from the ginning factories. In many cases it is not possible to make these purchases, particularly in a financially poor season, until the time for sowing the new crop arrives. By this time there is, on occasions, insufficient seed left in the mills' hands for the full requirements of the Province, apart from which such stocks as do exist are not always of the best quality, the result being low germinating percentage and poor yield of the next crop. A shortage of seed for cultivating purposes also means that any stocks in the hands of wealthy jungle traders are held for exorbitant prices, or made the means of such traders purchasing a large portion of the unfortunate cultivator's new crop at a very favourable price to the trader.

I understand the Agricultural Department has not the trained staff available at present to undertake the control of seed distribution, but I consider this question of the utmost importance, and one that should be taken in hand as soon as possible in the interest of the cultivator, as there is a little doubt that a well-organised system of selection and distribution of the present strains would mean a better yield per acre and also possibly a higher ginning percentage, i.e., more lint to seed.

Groundnuts.—The marketing system in Burma is described below:—

There is no trade in kernels and all nuts are marketed in the shell.

In the case of groundnut central marketing is more in force than in the case of *kapas* and a very small portion of the crop is purchased in the jungle by brokers acting on behalf of the mills. In a large number of cases cultivators bring in their own nuts for sale in the town market; and the balance of the crop is handled by small jungle traders working with their own or borrowed capital, who also bring their purchases into the town market for sale. The up-country mills buy their requirements in these markets through brokers for cash, while the dealers supplying the Rangoon mill's requirements are also competitors for such supplies in these up-country markets.

Here again the cultivator has often to sell a portion of his crop forward at a cheap price in order to obtain sufficient money to see him through the growing season, but as the demand for the Burma crop for local consumption in the form of oil is greater than the supply, competition for the available supplies is very keen and there is therefore little doubt that the cultivator receives full market value for that portion of his crop that he is free to market himself.

As the cultivator in the case of groundnut keeps sufficient nuts in hand for the planting of his next crop, the question of Government seed control does not arise here.

QUESTION 21.—TARIFFS AND SEA FREIGHTS.—Existing customs duty and sea freights on cotton and groundnut products do not adversely affect the prosperity of the cultivator.

QUESTION 26.—STATISTICS.—(*a*) & (*b*) The crop reports at present published by the Land Records Department are of very little commercial value as far as cotton and groundnut are concerned and I would like to suggest, that by closer co-operation with the Agricultural Department, a more accurate estimate of yield and condition of crops should be ascertainable.

An effort might also be made to trace all the channels of consumption of the groundnut crop. Such information, if accurate, would be very valuable to the trade.

Oral Evidence.

63375. *The Chairman:* Mr. Edwards and Mr. Nelson, you are of Messrs. Steel Brothers, Rangoon?—Yes.

63376. Mr. Edwards, will you please tell us what the scope of the firm's business is?—We deal in rice, timber, oil and sundry produce like beans and cotton for export, and we import cotton goods, piecegoods, hardware and cement.

63377. I understand that you, Mr. Edwards, are prepared this morning to speak in the main about rice, and you, Mr. Nelson, are more concerned with cotton and groundnut?—Yes.

63378. You, Gentlemen, have provided us with interesting notes on these points. Would you like to make any additional statement or corrections at this stage?—(*Mr. Nelson*) No, I do not think so. (*Mr. Edwards*) There is one statement I have made about the size of the basket in the districts. I was referring to the western side, particularly the riverside. By rail, the basket is invariably smaller than in Rangoon. On the other side, the basket that is used in the jungle for measuring paddy is much bigger than the Rangoon basket.

63379. You, Gentlemen, probably agree that it is very important that the premium that you have to pay for the better qualities of rice, or as much of it as possible, should actually get into the cultivator's hands, in order to encourage him to produce rice of quality?—(*Mr. Edwards*) Yes.

63380. Do you think he is getting his share of the premium which you pay?—We have men whom we send round the districts to look for good paddy, and they get in touch with the cultivators. In some cases, I think the cultivator gets it, but probably not in all.

63381. Is it one of your difficulties that rice of high and uniform quailty does not exist in every district in sufficient bulk to make it easy for you to fix and pay a premium?—It is not. The standard good quality of course is in bulk. We take that at the standard market price. Inferior paddies come below that; but when we get really good, pure paddy, similar to the seed supplied by the agricultural farm, it is in very small quantities.

63382. You are quite prepared to pay a premium on the smallest quantity?—Yes.

63383. Do you, as buyers, deal actually with the growers?—No; we deal through a lot of these moneyed men in the districts. They buy up the paddy; they are not the actual growers of the rice.

63384. That is what I imagined. Is it not more than likely that the cultivator who happens to be the only man in his district producing rice of the best quality may have very great difficulty in getting the premium from the middlemen?—Very great difficulty, unless he can get in touch with the buyers from the mills; if he is dealing with the middlemen, he will not get it.

63385. And that, from the agricultural angle, is an extremely important point, because, unless the individual cultivator gets his share of the premium, better quality has no attraction for him at all. It is simply a question of quantity?—Yes.

63386. Unless he can get his share of the premium?—In some cases of good grain, they mix it with the higher grade. For instance, in these qualities I mention, the Ngatsaing and Meedoung, they get a premium for some very good strains of Ngatsaing by mixing it with Meedoung, which invariably gets a premium over Ngatsaing. It is very difficult to

get them to keep their grain separate. For instance, if a certain grade of Ngatsaing is lower than Meedoung, they mix it with Meedoung and sell it as Meedoung. As long as the percentage is not too high, it passes.

63387. You mention a fact which we have heard from other witnesses, namely, that it is really the "Milkmaid" brand milk tin which is the standard unit of measure?—Yes, on the western side; on the eastern side, it is a *lichi* tin.

63388. You do not think that, on the whole, this inconvenience and confusion of practice must be to the prejudice of the cultivator, and to the advantage of the middlemen?—In my experience, they generally operate in favour of the seller.

63389. The middleman is the seller, as far as you are concerned. From the cultivator's angle, you do not think a more regulated practice would be an advantage?—It would be an advantage for both sides, and what I have suggested is that sale should be by weight and not by measurement.

63390. You find just the same thing in Great Britain. The farmer always thinks himself to be just as good a judge of the weight of cattle as the butcher; in fact, he rather prides himself upon it. Of course he is not; whereas the farmer only sells his own cattle, the butcher or the dealer buys cattle every day of his life, and exactly the same thing applies to many other phases of marketing. Do you agree with that?—Yes.

63391. It is really in the interest of the cultivator that a standardised practice should be introduced where possible?—Yes, I think so.

63392. You give us an outline of the weight *cum* measurement basis upon which you buy paddy?—Yes.

63393. But the cultivator does not come across that system; does he?—No.

63394. He sells by measurement alone?—Yes, he sells by measurement alone.

63395. Do you think that firms dealing in rice, and the larger millers, would support the idea of a committee or group, representative of themselves, the Agricultural Department, the distributing interests and the cultivator, with the object of bringing the needs of the market, as far as possible, home to the cultivator, and in order to regulate the practice and to disseminate sound information?—Yes. I am sure the millers would co-operate.

63396. Do you think that they would be willing to take some share of what ought to be a well-managed and modest expenditure?—I think so. As it is, we do all we can to get in touch with the cultivators. Often some traders come into the mill themselves with their own paddies, and we point out to them the paddy that we would like to get, if they do not bring very good quality. Our own agents, whenever they go round the districts, show the cultivators what to supply.

63397. Do you not think that if you bring together people who have got experience of all branches, that is to say, production, distribution and marketing, you get the advantage in council of the experience gained in all these branches?—Yes.

63398. Has your own firm taken an interest in the agricultural side of rice production?—We imported some seed from Bangkok and tried growing it under our own supervision in order to get a purer grain and our efforts were successful. We distributed quite a lot of seed in various districts.

63399. Have you been round the rice-breeding farm?—Yes, I go round every year. Sometimes I go twice a year.

63400. I take it that you take an active interest in this work?—Yes.

63401. Are you satisfied with the work?—Yes.

63402. When you say, on page 225 of your note, that the crop returns published by Government are accurate, I think you take a rather different view as regards returns dealing with rice, from that expressed by Mr. Nelson?—I refer to rice only.

(*Mr. Nelson*) My experience is that the quantity shown in these records as regards cotton, and particularly as regards groundnut, is usually not quite accurate. It is very difficult to absolutely check the crop because the only export is cake.

63403. Can you put your finger on the weak spot?—I think that the people who are making these records are not particularly interested in the yield. They are after acreage.

63404. You would be in favour of further and more accurate crop experiments, for testing of yields and for crop experiments?—Yes. I think the district officers and village headmen have a fairly accurate knowledge of what is likely to come out of the land.

63405. What is the effect of bulk storage in relation to rice? Have you ever suggested the use of elevators?—(*Mr. Edwards*) No. It may have been suggested but I have never seen it put into practice.

63406. Do you think that the physical properties of rice are such as to make this feasible?—I do not think you can do this with rice; with paddy, you can.

63407. Do you think that it is important that the outturn of high quality rice should be raised in Burma?—I think it should be raised.

63408. Is there a contrary view in the trade, based upon the claim that there is a large market in the world for rice of second quality and that Burma had better devote herself to satisfying that particular market?—I do not think so. I think there is a bigger demand for better quality rice. We have had experience of that in India where we used to send a very low grade of rice. Now they require a much better quality.

63409. Do you attach great importance to seed distribution and propaganda work directed towards improving the quality of Burma rice?—Yes and particularly as regards uniformity. The principal trouble in the case of rice is that it is so mixed. It is not an even grain like that in Siam and Calcutta.

63410. What about the trend of the quality turned out in the last ten years? Do you think it is improving?—It is improving.

63411. Has the reputation of Burma rice risen in the world market?—I do not think so.

63412. If you grew enough of the better quality, it would?—At present Burma rice is sold in European markets as Burma rice. It is the cheapest rice. If we turned out larger quantities of better quality, it would have to be sold in the European markets under a different name probably.

63413. You would have to build up a trade reputation?—Yes.

63414. Are you approaching the point where that would be possible?—Not yet.

63415. Would you say that, broadly speaking, the cultivator can hardly hope to get a full premium for quality until you do build up a trade demand for a higher quality of Burma rice under a new trade designation?—If we could get it pure, the cultivator could get the premium.

63416. That would appear to be a very strong argument for encouraging all concerned to support the Agricultural Department with all moral and material means?—Yes.

63417. Mr. Nelson, do you think that in the case of cotton the cultivator is getting a fair premium for quality?—(*Mr. Nelson*) There is a great deal of difference in the quality of the *kapas*. In certain areas, particularly round one or two Government farms in Upper Burma, a premium is paid for better and cleaner cotton but the staple is no better. Various tests have been made and I do not think that it has been found that much better cotton can be grown in Burma but a lot can be done to stop malpractices. The question is largely wrapped up, in the present trade conditions and with the cultivator's indebtedness to the moneylender.

63418. You are not hopeful that experiment and demonstration may result in the production of a better type of cotton?—I do not think that a very much better type of cotton can be grown.

63419. From your experience, do you say that no material improvement is possible?—Well, conditions in Upper Burma are very poor indeed. It is only in certain tracts, as far as my experience goes, that the cultivator will plant cotton.

63420. Do you know the tracts?—I know the tracts fairly well.

63421. It has been suggested by some that development by means of irrigation and tube wells might be successful. What is your view?—I hardly think so, although this is a matter for expert decision.

63422. Tube wells have been successfully sunk to irrigate cotton?—That is possible, but that is taking a very very long view. As far as my knowledge goes, the population is hardly sufficient at present in Upper Burma to undertake any very big operations.

63423. Are you familiar with the open markets for cotton that have been established in India?—I have read articles on them. We had a few meetings on that particular subject. We did our best to establish them in Upper Burma but without success. It is rather different as regards Lower Burma. The cultivator there seems to be in a rather better financial state and a lot of the *kapas* is brought direct into the towns.

63424. You hardly think that, at this stage, it would be possible to introduce open markets?—I do not think so.

63425. Do you agree that good markets, in your experience, have a very healthy reaction upon production?—Yes.

63426. Would you tell us something about groundnut? How comes it that the trade is all in unhusked nuts?—I can only put it down to the fact that the groundnut cultivation has only expanded in recent years to any great extent. The crop is a small one compared with other countries and is not exported. Another factor is the general use of machinery of the Anglo-American press type for extracting oil.

63427. Do you think that, if suitable machinery were installed, there would be a change for the better?—There is no export demand at the present moment. Burma is producing less nuts than she requires for her own consumption in the form of oil. There was a big import last year owing to the crop being short. As a matter of fact, the prices of groundnut fell towards the end of the season, as a result of these large imports, to such an extent that the cultivators in certain areas started to consider whether it was worth while planting this crop again this year.

63428. What are the main uses to which this oil is put in Burma?—It is used mainly as *ghi*, that is, for cooking purposes. In the villages it is used for all household purposes.

63429. You are satisfied with the system of marketing groundnut?—I would not say that I am satisfied. I think that something could be done in regard to standardising a better or hardier kind of groundnut. The quality in Burma is very mixed indeed in regard to the percentage of oil, and the weather conditions are very trying to the cultivator of both cotton and groundnut.

63430. I am going to read to you an extract from "A Collection of Papers* written by Government Officials for the Royal Commission on Agriculture, 1926-28," describing the marketing of groundnuts, and will ask you whether you agree with it as a picture of the conditions: "The Magwe market, which is probably the worst from the cultivator's point of view, may be taken as a sample of the seller's experience in disposing of his crop. The cultivator arrives in Magwe (generally overnight in order to save his cattle travelling in the heat of the day), he puts up at the compound of his broker and early in the morning the local buyer appears on his bicycle and bargaining begins. The buyer examines the consignment and depreciates it as much as possible: the broker, if he is honest, holds a brief for the cultivator (by repute he seldom is), his bias is towards the buyer with whom he has many transactions, whereas he sees the seller but once a year. If a bargain is struck, the cart of nuts is chalked, and proceeds to the buyer's godown or dump. Here the usual chicanery takes place. The nuts are delivered on a weight *cum* volume basis. The baskets vary considerably at the various stations. The Rangoon basket is supposed to weigh twenty-five pounds, and the price advices are on a fair average quality standard. The buyer's measurer takes over on a Magwe basket heaped, which normally weighs thirty-seven pounds. If the Rangoon quotation is, say, Rs. 180 per 100 baskets, the Magwe buyer adds to this fifty per cent to cover the basket difference, and deducts Rs. 50, the freight charge to Rangoon, to get a starting price; whatever he is below this is gain, gain of a perfectly legitimate kind: but it is at this point that the cultivator is skinned. From time to time a basket is weighed and, should it fall below thirty-seven pounds, a cut is made on the price

*Not re-printed.

of the consignment. No bonus is given for an excess in weight as in the case of paddy. The basket is heaped up with nuts and may be pressed down or shaken. In the latter the weight may go up as high as forty pounds per basket, and the loss be as much as eight per cent of his crop. The nuts spilled are the perquisite of the measurer; in a morning's weighing this may amount to something considerable as any 'broken basket' is also his." Is that a fair description?—I do not think so. It is a description which is all against the buyer and all in favour of the cultivator. Although it is quite true under certain circumstances, for instance, at the beginning of the season when nuts are coming in wet and adulteration has gone on to a large extent. The buyer says: "Well, if you are trying to do me down, it is up to me to protect myself" and Magwe is certainly a very bad centre for malpractice by jungle traders. But when groundnuts get dry and the mills start to buy in any quantity, as far as I am aware there is no question of a weight *cum* volume basis. It is really when they are dealing with Chinese traders that we are faced with some difficulty because the Chinese traders are always out to get the best they can out of an ignorant jungle seller. At any rate, I do not think that these reports can be called a fair illustration of the usual conditions prevalent in Magwe.

63431. Then the writer goes on to give us, in outline, his ideal towards which reform should be directed, *viz.*, (1) an open market with daily market prices published. Do you agree with that?—Yes.

63432. Then (2), sale by weight with a bonus for quality, fair average quality?—Yes.

63433. And, (3), genuine weighment by neutral tallymen?—Yes, provided the weights are all standardised, although I do not think this will be found practicable.

63434. You suggest, at one point in your note, a comprehensive survey of the channels of consumption?—That is, of course, very difficult. But there is also the commercial, the miller's point of view. He wants to get some idea of what quality is going to be marketed. Yearly only a percentage of the groundnut crop, anything from forty to sixty per cent, is being marketed to the centres, and if the crop is short overhead he has some difficulty in arriving at the figure he reckons he is going to put through his hands for the year.

63435. I put it to you, if such a survey is likely to be of value, would the trade itself not be the best agency for making such a survey?—We do so in so far as our trade allows us. We get into touch with the Commissioner of Land Records and supply him with a note at the end of each year, both for his benefit and for our own record.

63436. You have heard the answers which Mr. Edwards gave to my suggestion as regards rice, namely, that some joint committee of the several interests concerned might be helpful. What do you say to the same principle being applied in regard to cotton and groundnut?—I am in favour of it.

63437. Are you in touch with the work of the Agricultural Department in the matter of cotton and groundnut?—Yes.

63438. Are you satisfied with it?—In Upper Burma, the feeling amongst mills is that the Agricultural Department at the present moment have hardly the staff to carry out experiments to the extent that we should like to see them carried out. Progress is very slow.

63439. Do you think the department is working on the right lines?—Yes, as far as I have seen.

63440. *Sir Thomas Middleton:* Mr. Edwards, when a Rangoon rice-miller talks of quality in rice, what precise meaning does he attach to quality?—He means uniformity and the milling properties.

63441. Uniformity covers absence of any admixture of dust, etcetera. Now, let us take the milling properties?—Uniformity means the size of the grain; the grain must be of the same size. Our trouble is that we get grains of different sizes, and it is harder to mill because the proportion of broken grain is much higher than it would be if the grains were all of one size.

63442. I see; I misunderstood your first answer. Now with regard to the milling quality. Does any particular variety of rice, when cleaned and

properly dressed, vary much in the proportion of rice to paddy in different seasons?—No, it is pretty constant.

63443. In the same season, does one and the same variety differ much when grown in different districts?—Yes, it varies, according to weight principally.

63444. I see that you give a slight premium for weight?—It is worked in this way. If we buy 100 baskets of paddy and it weighs fifty pounds, *i.e.*, four pounds over forty-six, we pay for 110 baskets of forty-six pounds.

63445. If you multiply 4 by 100 and compare that with a ten-basket weight, you will find that the ten baskets leave a premium?—Yes; in calculating in that way it is an advantage to the seller.

63446. You attach importance to a high weight per basket?—Yes; the higher the weight the better the yield that you will generally get out of the paddy.

63447. Just as in the case of barley?—Yes.

63448. Adverting to barley for a moment: We get for example with the same variety grown under different conditions in the same season, a variation from fifty-four to fifty-six pounds. With oats one might get a range from forty-two up to forty-eight pounds. What is the range in rice?—It will vary from forty-two to fifty-three in the Ngasein grade. It is all classed as Ngasein, but it may vary slightly. In different districts it may go under different names.

63449. When you talk of quality you are not thinking of the cooking properties? It is yield you are thinking of?—Yield and appearance of the raw grain. Exported Burma rice is not sold for its cooking properties; it is not valued for its cooking properties. Some of the best looking rice is not the best eating rice. The best eating rice hardly leaves the country because it is too expensive to export.

63450. Mr. Nelson, where does your cotton go to?—Mainly to Japan in recent years. But a certain amount goes to Liverpool and a certain amount to the Calcutta mills.

63451. How does the quality of Burma cotton compare with Berars for example?—It is just below Berars; it is between Bengals and Oomras.

63452. At what season of the year does it ripen in Upper Burma?—An early crop, such as we have had this year, starts to come in about the first week of October in small quantities, and is in full swing in November.

63453. Does cotton-picking range over a long period?—Yes, according to the weather conditions. With regard to this year's crop, I do not think that they will finish harvesting till the end of November.

63454. Are you troubled much with dust and leaf in the late pickings? —Leaf, particularly if there have been showers during the harvesting season.

63455. Not with dust?—We do get a certain amount of dust of course, but not to any great extent.

63456. Have you handled Indian cotton at all?—No.

63457. *Mr. Calvert:* Could either of you gentlemen tell me whether the commercial community of Rangoon would like to be allotted a larger share in controlling research work in agriculture, or are you quite content to leave it to the Government department?—(*Mr. Edwards*) At present we have no staff conversant with the work.

63458. But in an advisory capacity?—I think we would like to have a representative.

63459. You think that with your knowledge of markets, you would be able to give advice of value to the research worker as to the kind of thing which would bring more money into the peoples' pocket?—Yes. That is done now. The department sends samples to the Chamber of Commerce and asks for their opinion as to the value of the different grains, and that they always give.

63460. Actually, you are not allotted any definite position in the control of research work?—No.

63461. It is merely an unusual case that you mentioned?—Yes.

63462. Then the commercial community is also very much interested in gross outturn and therefore in the seed supply?—Yes.

63463. Do you think you could lend useful service in the organisation of a system of supplying good seed?—(*Mr. Nelson*) I think in cotton we certainly could. Conversations have gone on between ourselves and the Agricultural Department in Lower Burma as regards the selection of special *kapas* for ginning, and after ginning keeping the seeds separate and then seeing that the seeds get to the cultivator at a reasonable price. I think some workable schemes will be brought about very soon.

63464. You have heard, of course, of the Indian Central Cotton Committee?—Yes.

63465. The question arises whether anything on somewhat similar lines could with advantage be constituted for rice, thereby enabling the commercial community to play a definite part in helping forward experimental work in cultivation?—(*Mr. Edwards*) We distribute seed now where we can. Two years ago we bought a lot of seed from the farms and distributed it to the landholders that we knew; but unfortunately these landholders sold their stock to the mills in their districts and we never got it back.

63466. Do you know whether the whole of the cotton grown in Burma comes to the ginneries, or is it dealt with in the homes of the people?—(*Mr. Nelson*) A certain amount is dealt with in the homes of the people. My experience is that that quantity is becoming less and less. During the last two or three years there has been a lot of hand-weaving, but the yarn is mostly bought.

63467. Do you think that the seed passing through the ginneries can be controlled?—Yes.

63468. Do you think the owners of ginneries in this country would be prepared to assist in the supply of any tested seed?—I think certain ginneries would, but some might require legislation before they could be brought to book.

63469. Of course, the whole success would depend on the seed from the ginneries being a very large proportion of the total seed used?—Yes.

63470. Do you think the owners of ginneries in this country would agree to such a scheme?—Yes.

63471. *Dr. Hyder:* How many varieties of cotton do you grow?—*Wagale* in Upper Burma and *wagyi* in Lower Burma. *Wagyi* commands a small premium for cleanliness and length, while *wagale*, as far as I am aware, is slightly stronger staple.

63472. Do these varieties get mixed up?—Yes; in Lower Burma there have been difficulties during the last two or three years, and the Agricultural Department and ourselves are looking into it.

63473. Do the Agricultural Department do anything to keep apart these two varieties of cotton?—At present, no. I understand there is an Act to prevent that sort of thing in India. The inclusion of Burma was considered at the time here, but it was thought not necessary. Of course the mixing at present is not very serious, but it might tend to be so.

63474. With regard to cotton, is Burma a separate market, or is it inter-connected with the Indian markets in general?—It is quite a separate market. Burma cotton is sold quite separately; you cannot tender it against a contract for any other kind of cotton.

63475. My question relates chiefly to the price. Does the price for Burma cotton follow the prices prevailing in the Bombay market, or do you get dissociated?—No. It comes under the head of short staple cotton, and it ranges closely to the Oomras and Bengals.

63476. So, the prices follow closely?—Yes. Very closely to Oomras and Bengals.

63477. Do you receive any rebates from shipping companies on your shipments to Europe, in the matter of rice or cotton?—(*Mr. Nelson*) There is an ordinary shipping rate which goes into our calculation in working out the price, but there is no indirect benefit.

63478. There may be a certain price in Europe which includes freight; a portion of that freight might be intercepted in Rangoon, neither the shipping companies nor the cultivators benefiting thereby?—That is not the case in Burma.

63479. What is this *wape* system?—The cultivator takes seed on credit, and in return for it he gives a share of his crops the next year at a rate which is usually fixed by the seller of the seed at a very low figure, and one which is going to leave the seller of the seed (that is, the buyer of the share of the cultivator's next year's crop) in a favourable position.

63480. So that, the cultivator here sells his crop forward?—Yes, either to the moneylender for the money he takes to raise his crop or to the person who advances him seed.

63481. You said that the rice which you export to Europe is not eaten there; for what purpose is it bought then?—(*Mr. Edwards*) It is eating rice; I said that the best rice in appearance is not the best for eating; it may look very well as raw rice, but it is not the best eating rice; the best eating rice here has got a poor appearance; it would not be bought by the householder at home.

63482. *The Chairman:* Does that apply to the Indian market?—I am not quite sure; I do not know.

63483. *Dr. Hyder:* You say that the best eating rice that is exported to Europe is different from the best eating rice that is grown?—I think, in Europe, they buy rice according to its appearance; it has got to be polished and it must look nice.

63484. It may not have very good properties as food?—I do not say that. It may be all right as a food, but other rices here which may not finish in the same way, I consider, are better eating rices. It may be a matter of opinion.

63485. *Professor Gangulee:* I understand that the exporting firms have been greatly benefited by agricultural research on paddy in Burma. Are you prepared to make any contribution to the Agricultural Department to conduct researches on crop improvements?—We might; we might not. I do not say that we have received great advantage from agricultural research; it is the grower who receives the most advantage; he gets a higher price for his grain; we are only middlemen.

63486. Do you get a better quality of rice since the Agricultural Department has come into being?—Yes; but we pay a premium for the quality.

63487. Have you ever paid premia as high as thirty rupees for the best variety?—No.

63488. What is the highest premium you have paid?—Twenty rupees.

63489. Do these qualities for which you pay a premium lose their identity in the process of milling and exporting?—If we pay a premium we mill them separately and export them.

63490. And get better prices from your buyers?—We expect to.

63491. So, as a result of the improvement in the grain, you get more profit than you otherwise would?—It is not constant; it depends upon the market for the finished grain. We pay more for the paddy and we get more for the rice.

63492. Which are the principal Western markets for Burma rice?—Hamburg.

63493. Any other continental countries?—Germany and Holland.

63494. Which are the chief countries which compete with Burma in the export of rice?—Siam, Saigon and Java.

63495. Are they not extending their cultivation and improving their varieties of rice? Do you find any difficulty in retaining the position of the Burma rice in the market?—Judging from my experience so far, the stock is always sold; the rice is always got rid of from Burma.

63496. That has been the situation up till now. But will it be the same in the future? For instance, in Turkey they have increased the area under rice by about threefold within the last few years; that is also the tendency in the other exporting countries you mentioned just now?—Yes.

63497. Do you envisage any difficulty in maintaining your present position in the market?—If every country increases its output of rice, and every country gets a full yield every year, there will come a time when there will be over-production.

63498. You pay, I understand, Rs. 5-4-0 a ton as export cess. What are your views on this cess? Is it affecting the producer in any way?—I do not think so.

63499. Is it in any way affecting your competition with Siamese or Saigon rice?—No.

63500. Do you export a large quantity of bran?—Yes.

63501. Which countries buy it?—England and Germany.

63502. *Mr. Kamat:* Supposing a small export cess were levied on the export of bran, would the result be that bran would be cheaper for the Burmese consumer?—As far as my knowledge goes, I do not think it would affect him, because there is an enormous quantity of bran produced, and very often, in the latter part of the year, what is called cargo rice dust, which we cannot export, is higher in price than bran, which is really a better product.

63503. We are told that, in certain Indian States, legislation has been resorted to which lays down that the cultivator should use only tested seed. Do you think a similar beginning could be made in the same direction in a samll tract of this Province, that only tested seed should be used by the cultivators?—I do not think it is necessary. I think it is up to the cultivator to select his seed, if he wants more for his grain.

63504. Either owing to ignorance or because tested seed is not available throughout the district, in actual practice he does not necessarily use good tested seed?—He would have to buy it then; would he not?

63505. Yes?—I do not quite know whether he would have the money to do so. I think they keep seed from the previous year. As long as they do not lose, I think they would use tested seed.

63506. Supposing legislation were resorted to, what would be the consequence? Are there any people who would stock only tested seed and sell it to the cultivators? I mean, could you enforce a law like this?—I do not know enough about seed distribution to give an opinion on that.

63507. You say that cash advances, or earnest-money, is given when you make contracts with the cultivators?—Yes.

63508. Instead of this earnest-money being given in cash, would it be feasible to make these advances in the shape of tested seed?—I do not think it would.

63509. Even that would not be a practicable proposition?—I think it would be very cumbersome. It would be very difficult to carry round seed for distribution in place of earnest-money for a contract.

63510. In the case of firms like yours you make contracts through your brokers with a large number of growers?—The contracts vary from 1,000 baskets up to 50,000 baskets perhaps. They are mostly contracts made by our brokers; the probable average would be 10,000 baskets.

63511. When your brokers make these contracts, and give certain cash advances as earnest-money, what difficulty is there in giving tested seed for the earnest-money instead of cash, at any rate in the case of firms like you?—We have no facilities in the districts for carrying stocks of seed. We have no agencies in the districts.

63512. Even big firms like you could not be utilised as agencies for the spread of tested seed?—We could spread it from our mills in Rangoon. We could carry seed there and distribute it to the cultivators or traders who come in. We have no facilities, at present, for distributing it in the district itself.

63513 *U Ba Cho:* The Agricultural Department distributes good selected paddy seed to cultivators?—Yes.

63514. Then these cultivators grow the seed and the paddy that they get is sold to the traders?—Yes.

63515. The traders either store it in their own godowns or send it to the mills?—Yes.

63516. So, good paddy will get mixed up with other grains?—Yes. What the traders do is, they buy some selected seed, and mix it with lighter grain.

63517. There I agree with you. But my point is that the good grain always gets mixed up on its way from the field to the mill?—Yes.

63518. Would you encourage the cultivators, either individually or through co-operative societies, to sell the grain to the mills direct?—We do encourage that at present.

63519. You give to the cultivators, or the societies, all the facilities and all the advantages which you would give to your own buyers?—We give more, because we provide transport. If we can get into touch with societies or growers of selected seed, we are quite ready to supply transport.

63520. You know that the price of paddy increases from the time of the harvest up to the middle of the rains?—Yes.

63521. If these cultivators or societies want to keep the paddy till the price has risen to a certain extent, would you be able to help them to do so?—Most of the cultivators are not able to do it.

63522. They want to keep it, but at the same time they want something with which to meet current expenses?—They want to store the grain, but at the same time they want advances from somebody to meet their expenses?—Yes, it is so difficult to know what the price of rice is going to be. We are not anxious to give advances for storing paddy. We could not store the grain for them. We buy a certain amount ourselves outright, and the money is sunk in that. We store that grain perhaps for one, or two, or three months, but we are not in favour of giving advances to the cultivators to store the grain.

63523. To what use is the bulk of the rice exported to England and Germany put?—I think principally for starch.

63524. For consumption or for industrial purposes?—For industrial purposes.

63525. The bulk of the rice that you export is Ngatsaing?—Yes.

63526. Do you export any Emata for consumption in Europe?—Central Europe is the best market for Emata and Koukyi.

63527. Do you export any appreciable quantity of this kind of paddy?—Most of the Moulmein crop is Koukyi, and to a very big extent the crop around Rangoon. We do not export it to any big extent.

63528. The export to the Straits Settlements, Java, Japan and China is mostly for human consumption?—Yes, and Japan, Sumatra and the Straits take a lot of Meedoung grain.

63529. You have noticed that the railway charges are considerably more for the transport of rice than for the transport of paddy?—Yes.

63530. Do you consider this fair?—I think it works out cheaper on actual weight of paddy and rice, because in paddy you are paying freight on husk, which has very little commercial value.

63531. *Mr. Reynolds:* In your note on crop statistics, you say "The crop reports at present published by the Land Records Department are of very litttle commercial value as far as cotton and groundnuts are concerned." Could you tell us what kind of forecasts you want? Is it their inaccuracy or their form that you take exception to?—I should like to have some more information about the general condition in the first forecast, which is published very late.

63532. You want information about the early crop?—Yes.

63533. It is earlier information as to the condition of the crop that you want? You are not complaining about the value of the forecast when it does come out?—As far as cotton is concerned, it can be checked by the figures of export, and I think the figure you work out is a fairly accurate one.

63534. I think you rather complained about the groundnut forecast?—I was referring to the groundnut crop as a whole.

63535. What point exactly do you dislike about the groundnut forecast?—The yield shown against last year was exactly the same, more or less, as that shown in the previous year. That is about 165,000 tons. Actually it turned out to be twenty-five per cent short.

63536. Are you speaking of any particular district?—I am speaking of the Province as a whole.

63537. How much of that is traceable?—I am taking it that the cultivator's own consumption is, to a fairly large extent, stationary. I am

referring to the cultivator's own requirements. He takes his bit of the crop and the balance comes to the market, and on Government figures it is only half the crop that we can trace.

63538. Is not the home consumption of all these crops a very fluid quantity, depending very largely on the price?—I suppose it is, to some extent.

63539. It certainly is so with the rice forecast?—Yes.

63540. In the case of groundnut, you think that the outturn is not satisfactorily estimated?—That is our complaint, on the whole, as regards groundnut. For instance, last year contrary to expectations we found that the crop was short. We have got our own means of finding out the approximate position from the jungle brokers, but we have no means of checking it from the Government figures. Your estimate last year was just about the same as in the previous year; but these rumours that the crop was short eventually turned out to be correct.

63541. I see that last year, in the final forecast report from the provincial exporting districts, a shortage of twenty to forty per cent was duly recorded in the forecast?—I have not looked up the details of this particular forecast. As far as I know, the Government total figure for last year was not very far off from that for the previous year and it is this final Government total that trade meantime has to work on.

(The witnesses withdrew.)

Mr. DANIEL PO DAN, Bar.-at-Law, Tharrawaddy.

Replies to the Questionnaire.

QUESTION 2.—AGRICULTURAL EDUCATION.—(*i*) No.

(*ii*) There is need for at least one agricultural school similar to the one at Pyinmana. One attached to one Hmawbi Farm will be very suitable for boys of the agricultural class with elementary education. There is no agricultural school in Lower Burma.

(*iii*) It would be a very good thing if it could be done.

(*v*) The opportunity to study as well as good prospects.

(*vi*) No.

(*viii*) They are of great value and deserve to be supported. I have heard of very few school farms.

(*x*) There are no successful big farmers in Burma whose example the people can follow. Boys should begin the subjects which will be useful in agriculture early.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(*a*) The introduction of new seeds as well as the distribution of improved seeds by the Government farms.

(*b*) So far there have been no methodical or well-advertised field demonstrations in Tharrawaddy district by lantern slide lectures showing up clearly the advantages to be gained by the adoption of new methods supported by expert advice; by dissemination of information throughout the Province through the medium of the vernacular papers, particularly the results obtained in Government farms by up-to-date methods.

(*c*) Expert advice given on a practical farm will be welcome.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—(*a*) (*i*) (*ii*) & (*iii*) The main causes of borrowing and reasons preventing repayment are—

Cultivators get their income only once a year, while they have to incur expenditure throughout the year; the ease with which they obtain money from *chettyars*, moneylenders, landowners and speculators improvidence; spending all the money in a good year in *ahlus*, *shin-byus* and funeral ceremonies especially in *phongyibyans;* unfavourable rainfall and not getting the expected outturn, serious loss of cattle due to rinderpest and other diseases.

Field labourers suffer by being obliged to part with their paddy before harvest at a low rate (*sababe*).

QUESTION 11.—*Crops.*—(*a*) (*i*) (*ii*) & (*iii*) There are already many new and improved varieties which the Government farm at Hmawbi is distributing.

Coffee grows well in Burma and it may be grown more generally in the Province.

QUESTION 14.—IMPLEMENTS.—(*a*) The paddy-reaping machine was introduced into Burma more than forty years ago. It was heavy and found to be unsuitable for the small field plots in Burma. The threshing machine works perfectly, but this too is very heavy and can be moved from place to place with too great difficulty to be of more general use.

(*b*) By practical demonstration on the fields after due notice and by publication in the vernacular papers; by offering facilities to become acquainted with the use of the improved implements.

QUESTION 15.—VETERINARY.—(*d*) The Veterinary Assistants are unable to cope with the work or do anything useful whenever there is an outbreak of cattle disease in several places. The villagers themselves can hardly do anything on account of the difficulty of arranging for a suitable place outside the village for segregation. Legislation dealing with notification, segregation, etc., is very necessary. If provision can be made for a sheltered place for infected animals, legislation can be no hardship to any one. Owners of cattle and villagers will be willing to co-operate.

(*f*) Inoculation is often done too late. It often proved unsuccessful in cases where contacts were concerned.

(*g*) Yes.

QUESTION 17.—AGRICULTURAL INDUSTRIES.—(*a*) The cultivator works on his holding from the 15th May to 15th January. In the slack season from January to May he carts paddy on hire, collects firewood, bamboo, thatch and manures his land. He has very little work of his own for about eighty days.

Field labourers have no regular work for about three months in the rains and four months in the hot weather.

(*c*) Bee-keeping is almost unknown in Burma. Poultry-rearing cannot be taken up by respectable Burman Buddhists.

Rope-making and basket-making can only be taken up by most people if they get paid for their daily work.

Sericulture can be carried on only in certain localities.

(*f*) Yes. It is very important.

QUESTION 23.—GENERAL EDUCATION.—(*b*) (*ii*) Education is not compulsory. It should be compulsory.

(*iii*) Parents think more of their convenience than the education of their children. Children in the third and fourth standards are of an age when parents can make very good use of them and are frequently employed in their houses and in the fields.

Oral Evidence.

63542. *The Chairman:* Mr. Daniel Po Dan, you are a Barrister-at-Law in Tharrawaddy?—Yes.

63543. Do you take a practical interest in agriculture?—Yes.

63544. Are you an agriculturist?—Yes.

63545. Do you own land?—I do.

63546. Do you cultivate it yourself or do you let it out to cultivators?—I let it out to cultivators.

63547. On what basis?—On produce rent.

63548. What share do you take?—Thirteen to fifteen baskets per acre.

63549. You say poultry-rearing cannot be taken up by respectable Burman Buddhists. What, exactly, is the objection? You seem to think that bee-keeping and sericulture are not so objectionable as poultry-rearing?—My point is that Burman Buddhists cannot do anything which encourages the taking of life, so it is difficult for the educated classes to keep poultry; but it is done all over Burma by the working people.

63550. You do not think that bee-keeping and sericulture are occupations involving the taking of life?—No, not as regards bee-keeping. Sericulture is generally practised by poor people in Burma in places away from towns.

63551. I think there is an unfortunately large proportion of crime in your district?—Yes.

63552. How do you account for it?—It is difficult to say.

63553. You do not feel inclined to give your views on this point?—It is difficult to make any definite answer.

63554. *Mr. Kamat:* With regard to the question of borrowing and the reasons preventing repayment, you say that field labourers suffer by being obliged to part with their paddy before harvest at a low rate. Will you explain that a little further?—The field labourers get about fifty baskets of paddy for working during the rains. They can get that paddy only in the harvest season. They are obliged to part with that paddy by a sort of advance sale, during the rains, at a somewhat low rate.

63555. What is your actual suggestion in this connection?—If these people could get money advances instead of selling their paddy it might help them; I mean money loans on interest.

63556. In some cases they do take money advances?—Very seldom. If they can take it as loans paying interest, it would be better.

63557. How does that make any difference?—Because the interest on the money will be low. By disposing of the paddy they have to sacrifice almost half the price they could have got in the harvest season.

63558. As long as they have to pay down at a certain time what difference does it make? If they have to pay in cash, all the same, they have to sell their produce?—Generally they are hired by the payment of certain baskets in the rains, not by money.

63559. I follow that. Your complaint is that they have to part with their paddy at harvest time?—They have to sell it in the rains before the harvest.

63560. What alternative would you suggest?—If they can borrow money instead of having to part with their paddy, they will not lose so much, even if they have to pay interest.

63561. *U Ba Cho:* You say, in answer to Question 2 (*x*), that there are no successful big farmers in Burma whose example the people can follow. I suppose you are confining your statement to your own district?—I do not know if there are any big farmers in any other districts.

63562. Are you aware that in the districts of Hanthawaddy, Toungoo and Pegu, many young men after completing their education return home and take up cultivation as a profession?—I have heard of one.

63563. There may be more young men but you may not have heard of them?—There may be; I do not know.

63564. You know that when the cultivators are in difficulty they can get loans under the Agricultural Loans Act?—Yes.

63565. From your experience, do you think that these people find difficulty in getting loans from the Government?—Great difficulty and inconvenience is experienced; in fact very few are able to get any money from the Government.

36566. In answer to Question 23, you say the children leave school at a very early age. Have you any idea how to improve the position in this respect?—I have suggested compulsory education.

63567. You mean compulsory primary vernacular education?—Yes. Some say that it would be a hardship to make it compulsory, but I have come across many others who say that it would be a great boon to the children and to the parents were compulsory education introduced. The children

would then be a help to their parents. There are several *poongyi kyaungs* where they may go to be educated, but many parents do not send their children at all, and this is in fact one of the causes which have contributed to crime.

63568. Do you know anything of the co-operative movement in your district?—I know something of it.

63569. Are you taking any interest in the movement?—No.

63570. *Dr. Hyder:* You are a lawyer practising at Tharrawaddy?—Yes.

63571. Do you take up civil or criminal work?—Mostly criminal work.

63572. When is your practice at its height?—In the dry season.

63573. Is that the slack season for the cultivators in Tharrawaddy?—Yes.

63574. And is that the period when you get most of the criminal cases? I want to know definitely from you whether there is any connection in your mind between the slack season and the increase in the number of murders and other crimes?—No.

63575. *The Chairman:* Have you taken an interest in the work of the Agricultural Department?—Yes.

63576. Are you interested in the growing of rice?—Very much interested.

63577. Have you been round the experimental farm?—Several times.

63578. What do you think of it?—I think it is doing a great deal.

63579. Would you like to see the demonstration side of the department generally strengthened in the mofussil?—Yes.

(The witness withdrew.)

Mr. J. D. STUART, A.M.I C.E., M.I.E., Chief Engineer, Public Works Department (Irrigation), Burma.

Note of Evidence.

IRRIGATION, NAVIGATION CANALS, EMBANKMENTS AND DRAINAGE.

I.—Irrigation.

Irrigation has been practised in the dry zone of Upper Burma from time immemorial.

2. Owing to the physical conformation of the Province there is no scope for the construction of irrigation canals on the scale of the great canals of the Punjab, but the fact that the area irrigated in Upper Burma has been trebled since 1901 shows that good use has been made of such resources as are available.

3. The indigenous irrigation works in charge of the Public Works Department in 1901, at the time of the Indian Irrigation Commission, were numerous. It is not necessary to set forth all the petty works in detail, and the following list gives a sufficient idea of their number and extent :—

(1) Shwetachaung Canal	Mandalay district.
(2) Minor irrigation works	Do.
(3) Mu Canal	Shwebo district.
(4) Minor irrigation works	Do.
(5) Do.	Sagaing district.
(6) Nwadet Canal	Kyaukse district.
(7) Ngapyaung Canal	Do.
(8) Thindwé Canal	Do.
(9) Minye and Tamôk Canals	Do.
(10) Zidaw Canal	Do.
(11) Kinda Canal	Do.
(12) Nathlwe Canal	Do.
(13) Kyimè Canal	Do.
(14) Htôngyi Canal	Do.

(15)	Kanna tank	Myingyan district.
(16)	Pyogan tank	Do.
(17)	Meiktila lake	Meiktila district.
(18)	Nyaungyan-Minhla tank	Do.
(19)	Minor irrigation works	Do.
(20)	Kyauksé tank	Yamethin district.
(21)	Minor irrigation works	Do.
(22)	Man Canal	Minbu district.
(23)	Salin Canal	Do.
(24)	Minor irrigation works	Do.
(25)	Taungtha tank	Magwe district.
(26)	Segyi tank	Do.
(27)	Minor irrigation works	Do.

4. Two major canals, the Mandalay Canal and the Shwebo Canal, were under construction at that time.

5. In 1904 the minor irrigation works in the Sagaing district were handed over to the cultivators for maintenance.

6. From 1st April 1926, the irrigation works in Burma, were reclassified, and for purposes of comparison of irrigated areas it will be convenient to set them forth as if this classification had existed from the first year, 1891, for which records exist.

The areas are therefore given under the heads—

(*a*) Productive Works for which Capital Accounts are kept.

(*b*) Unproductive Works for which Capital Accounts are kept, and Works for which Capital Accounts are not kept.

(*a*) Includes the Shwebo and Môn Canals (formerly known as Major Works) which were constructed between 1901 and 1911, and the more important of the indigenous works, *viz.*, the Canals in the Kyauksè district, the Shwetachaung Canal, Man Canal and Meiktila lake.

(*b*) Includes the Mandalay and Ye-u Canals (formerly known as Major Canals), and the Slain Canal, Nyaungyan-Minhla tank and Kyauksè tank under Unproductive Works for which Capital Accounts are kept, and all the numerous petty works for which no Capital Accounts are kept.

7. The average annual irrigation for five-year periods from 1891 to 1924, under these two heads, is given below :—

Period.	Capital Productive.	Capital Unproductive and Non-capital.	Total.
	ACRES.	ACRES.	ACRES.
1891-1895	166,152	72,179	238,831
1896-1900	191,314	150,493	341,807
1901-1905	180,740	115,719	296,459
1906-1910	306,099	140,227	446,326
1911-1915	404,456	153,736	558,192
1916-1920	422,342	209,580	631,923
1921-1925	464,501	273,382	737,883

8. The large increases under Capital Productive in the periods 1906—1910 and 1911 to 1915 are chiefly due to the Shwebo Canal being opened for irrigation in 1906 and Môn Canals in 1911. Under the Capital Unproductive head, the Mandalay Canal started irrigation in 1902 and the Ye-u Canal in 1918.

9. The drop in the average annual irrigation in the quinquennium 1901—05 requires some explanation.

The Mandalay and Shwebo Canals were under construction about that time. These canals absorbed several old irrigation works, such as the Aunghinle lake in the Mandalay district and Hladaw and Kadu tanks in the Shwebo district. The Shwebo Canal also absorbed a large part of the area that was formerly irrigated by the Mu Canal. These changes were

justified by the fact that the new canals gave an assured supply to such areas, in place of the very precarious supply afforded by the old works.

A definite decrease of the area irrigable by the indigenous works was thus caused.

The old works are far more dependent on the rainfall than are the modern canals, and large fluctuations occur in the areas that they irrigate, according to the nature of the season. To give an example, in 1901 the area irrigated by Minor Works in the Meiktila district was 47,000 acres less than in 1900, and the Mu Canal and Minor Works in the Shwebo district dropped 78,000 acres at the same time, of which 54,000 acres represented a decrease on the Mu Canal alone. In 1922 the Mu Canal irrigated 2,813 acres, the following year the area was 23,828 acres.

10. The work done in Burma since the appointment of the Irrigation Commission consists in the construction and opening of the four new major canals already referred to, and the remodelling, improvement and extension of old Burmese works.

11. The irrigation done by the four major canals in the last five years is as follows:—

——	1921.	1922.	1923.	1924.	1925.
	ACRES.	ACRES.	ACRES.	ACRES.	ACRES.
Shwebo Canal	170,217	166,916	163,073	167,277	172,470
Môn Canals	47,579	59,861	69,237	69,375	66,699
Mandalay Canal	68,214	69,901	72,392	72,113	74,400
Ye-u Canal	72,987	76,489	86,145	80,001	92,903
	358,997	373,167	390,847	388,766	406,472

12. Comparing the area irrigated by Productive Capital Works and by the other works separately, the increase in the former between 1901 and 1925 is 325,168 acres, or 206 per cent and in the latter 196,389 acres, or 214 per cent.

The figures are:—

——	Capital Productive.	Capital Unproductive and Non-capital.	Total.
	ACRES.	ACRES.	ACRES.
1901	158,162	91,968	250,130
1925	483,330	288,357	771,687
Increase ..	325,168	196,389	521,557

13. In 1901 the mileage of Government channels open for irrigation was 593 and in 1925 it was 1,717, representing an average increase of 45 miles per annum for twenty-five years.

14. The main crop grown on irrigated land is rice. This crop represents 90 per cent of the whole area. On the four major canals 99 per cent of the area is under rice. The canals in the Kyauksè district are responsible for about half the total irrigated area which bears other crops than rice. Sugarcane, sesamum, plantain and betel gardens account for the greater part of the non-rice irrigation in that district.

A large amount of double cropping is carried out in the Kyauksè district, sesamum being sown before Koukyi rice over a very large area.

15. The financial results of the irrigation works of the Province are shown in the following table :—

The Financial Results of Productive, Unproductive and Non-Capital Works.

Particulars.	Productive Works in operation.	Unproductive Works for which Capital and Revenue Accounts are kept.	Non-Capital Works for which only Revenue Accounts are kept.
	RS.	RS.	RS.
I.—Capital (Direct and Indirect) outlay to end of 1925-26.	1,86,25,079	1,47,96,785	..
II.—Income realised during 1925-26—			
Direct, viz., water rate and miscellaneous receipts.	(*a*) 73,189	(*b*) 1,15,569	22,123
Indirect, viz., share of Land Revenue due to Irrigation works.	23,05,999	8,33,349	1,40,773
Total, Direct and Indirect ..	23,79,188	9,48,918	1,62,896
III.—Charges (Direct and Indirect) for the year 1925-26—			
Maintenance including establishment.	9,41,536	5,82,149	1,15,686
Interest on Capital outlay ..	6,29,383	5,21,901	..
Total ..	15,70,919	11,04,050	1,15,686
IV.—Profit or loss during 1925-26—			
(*a*) Including interest on (Capital outlay) amount.	8,08,269	— 1,55,132	..
Percentage on Capital outlay ..	4·34	1·05	..
(*b*) Excluding interest on (Capital outlay—			
On total income, Direct and Indirect.	14,37,652	3,66,769	47,210
Percentage on Capital outlay.	7·72	2·48	..

(*a*) Includes Rs. 4,945 collected as water-rates.

(*b*) Includes Rs. 88,947 collected as water-rates.

16. The four major canals were constructed from funds supplied by the Government of India.

In 1921-22 the Government of Burma purchased these canals for Rs. 2,20,98,655, and the revenue derived from them is now entirely provincial. The old system of charging a separate rate for the use of the water has been discarded and a consolidated rate is now levied on all irrigated areas, the Irrigation Department being given a credit in some cases of a percentage of the consolidated rate, in other cases of the whole rate less a fixed rate credited to Land Revenue. This system was introduced in order to simplify the collection of the revenue and it has worked well.

17. A further important change in the revenue administration has recently been made. The Canal Revenue staff, whose duties consist of seeing to the distribution of water and checking the area irrigated, has been amalgamated with the Land Revenue staff on the Shwebo Canal, and this arrangement is now being introduced into other districts.

A special Superintendent of Land Records for irrigated areas, works in close consultation with the Executive Engineer, and it has been found possible to make appreciable reductions in the two separate staffs originally employed. The system has worked successfully on the Shwebo Canal.

18. The increase in the areas irrigated by the indigenous canals is very largely due to the application of more scientific methods of distributing the water. There is generally a shortage of water at the beginning and the end of the irrigation season, and by the rigid application of a system of *tatils*, a much larger area is matured than was formerly the case. The old wooden pipe outlets have been replaced very extensively by Kennedy's Gauge outlets, and their number greatly reduced.

Mr. Harvey records, in his "History of Burma," that the canals in the Kyaukse district used to irrigate rather more than 100,000 acres at the end of native rule. In 1901 the area irrigated was 101,883. The areas for recent years are as follows :—

	ACRES.
1922	163,684
1923	158,371
1924	153,992
1925	163,968

The figure for 1924 was affected by the fact that a weir on the Zawgyi was under reconstruction, and the work of remodelling the Pyaungbya Canal, which had been begun, caused a certain amount of difficulty in supplying water.

19. The revenue has always been assessed and collected by the civil officers. About 1906 a special canal revenue staff of inspectors and surveyors was sanctioned and introduced. The duties of this staff were to record all areas irrigated by each watercourse, and to assist in the distribution of water. The information so obtained had not previously been available, and was of the greatest use in analysing the efficiency of the various channels and showing where improvement was required. A useful check was also obtained on the areas recorded by the Land Records Surveyors. As stated in paragraph 17, the irrigation and land records revenue staffs are now being amalgamated.

20. *Projects sanctioned or under construction.*—(*a*) A scheme for the construction of a flood-modulating reservoir on the Panlaung river has been sanctioned by the Government of Burma for Rs. 43,04,707. The object of this work is to render safe the Panlaung Canal system in the Kyaukse district which has been a cause of anxiety for many years, owing to the deterioration of the river and the danger of an avulsion. It will also store water in the dry weather for the irrigation of the hot weather crops, and will safeguard the railway and roads in the Panlaung area from breaches caused by the severe floods to which this river is subject.

The design of the work is at present under reference with the Consulting Engineer to the Government of India.

(*b*) An estimate amounting to Rs. 26,80,662 has been sanctioned for remodelling the Salin canals, and another estimate for Rs. 9,60,000, for constructing a new distributary from the North Môn Canal to take over part of the area at present irrigated by the largest of the Salin canals, the Myaungmadaw.

These two works are inter-connected.

The Salin canals are inundation canals of very ancient origin. The system consists of five canals which take off from the right bank of the Salin *chaung*, and one from the left bank and irrigates an area of about 30,000 acres in a favourable season. The canals are run at a loss owing to the great expense of keeping the heads open and supplied with water. The supply in the Salin *chaung* depends almost entirely on rainfall, and is thus very precarious.

The works to be undertaken will bring 23,000 acres of the Salin Canal area under irrigation from the Môn river, which has a very reliable supply of water. A new high-level canal will be constructed from the Salin river, with a weir across the river. This canal will be used to feed the balance of the Salin area and will also bring a new area of 25,000 acres under irrigation.

(*c*) The Shwebo Canal is to be remodelled at a cost of Rs. 10,93,798.

The canal has scoured considerably since it was built and it has become necessary to regrade it. As a result of this work, it is estimated that an additional area of 29,726 acres will become irrigable by this canal.

(*d*) The Pyaungbya and Paleik Canals in the Kyauksè district are being remodelled at a cost of Rs. 7,21,000 and Rs. 3,46,306, respectively.

These are old Burmese canals, and the result of the work will be a more economical use of the water and an extension of irrigated area by 10,700 and 5,500 acres respectively.

(*e*) The old Man Canal in the Minbu district has recently been remodelled, and a new distributary made. The object of this work was to take away under the canal flood water which used to flow freely into it, to the detriment of the irrigated crops, and to irrigate a new area of 7,000 acres. This work is practically complete, the estimated cost is Rs. 2,81,708.

(*f*) A storage reservoir for irrigation will shortly be commenced on the Wundwin *chaung* in the Meiktila district. This will greatly improve the Wundwin Canal system, which at present depends on freshets at long intervals, and is one of the least reliable of the old works. The cost is estimated at Rs. 3 lakhs, and the area affected is about 4,000 acres.

(*g*) The Taunggan tank in the Mandalay district is being remodelled at a cost of Rs. 62,145. The distribution system and the means of feeding the tank with water were both very faulty. The area affected is about 3,500 acres.

21. *Projects under investigation*—(*a*) *The Ava Canal.*—The proposal consists of a large reservoir on the Samon, and a canal to irrigate 100,000 acres of land on which cultivation is very uncertain. As the supply in the Samon is most unreliable, it will be necessary to supply the tank with water by means of a feeder channel from the Panlaung.

The scheme is at present under the consideration of civil officers. It would cost about a crore and a half of rupees and the return on the capital expenditure would be so small that it is not likely to eventuate, unless Government can take a large proportion of the rise in the value of the land that would result from the construction of the canal.

(*b*) Surveys are in progress for the preparation of a project for improving the Mu Canal in the Shwebo district.

This is one of the oldest of the old Burmese works, but it has never functioned properly owing to the great engineering difficulties involved. It is now merely a catch-water drain which receives the flood water from a small catchment and distributes it through various sluices. The canal has silted up to a considerable extent, and although the Irrigation branch has built some large escapes in it, it breaches fairly frequently.

As I have shown in paragraph 9, the irrigated area fluctuates violently, depending as it does on the amount and distribution of the rainfall.

(*c*) Preliminary estimates have been prepared of the cost of constructing the Kalabyagyi Canal in the Yamèthin district. The project is estimated to cost Rs. 8,34,500 for an irrigable area of 10,500 acres and will be unproductive.

A reference has been made to the civil authorities as to whether the work is really necessary.

(*d*) An extensive contour survey of the area between the Thitson and Samon rivers, in the Yamèthin district, has been carried out with the object of preparing a project to co-ordinate the various small irrigation works in that area, in order that the best use may be made of such supplies of water as are available.

(*e*) A survey is in hand with the object of preparing projects to irrigate about 40,000 acres in the Magwe district.

(*f*) An estimate is under preparation for the construction of the Yenatha Canal in the Mandalay district. This canal will take off from the Chaungmagyi river above the Mandalay Canal weir. It will irrigate about 19,000 acres.

(*g*) In the Meiktila district the following tank projects are being worked up—

(i) The Taungnyo tank on the Theinbon *chaung*.
(ii) The Tagundaing tank on the Tagundaing *chaung*.

It is not expected that these works would be productive, but protective works are justifiable in this locality.

(iii) A modulating reservoir on the Mondaing *chaung*, the main feeder of the Meiktila lake.

This would reduce flood levels and retard silting in the lake.

II.—Navigation.

22. There are two navigation canals on which tolls are collected by Government, the Pegu-Sittang Canal completed in 1877-78 and the Twante Canal completed in 1916-17.

The former canal connects the Sittang with the Pegu river, and enables timber from the Sittang valley to be floated to Rangoon *viâ* the Pegu river. It also carries a considerable traffic of rice, both husked and unhusked, vegetables, bamboos and firewood.

The Twante Canal carries a heavy traffic in rice from the delta districts to the Rangoon mills.

23. The Shwetachaung Canal in the Mandalay district combines the functions of an irrigation and a navigation canal. The right of collecting tolls is at present auctioned annually, but the recent construction of a meter-gauge line parallel to the canal, and the eventual construction of a metalled road along the canal bank are likely to put a stop to water carriage for goods.

24. The Pegu-Sittang Canal in 1924-25 brought in a gross revenue of Rs. 2,22,972, the working expenses being Rs. 4,46,680. This canal has never paid for its upkeep, but it is a very useful waterway.

25. The Twante Canal brought in Rs. 4,61,110 in the same year, the working expenses being Rs. 1,17,273 and the net revenue Rs. 3,43,837, representing a percentage of 6.69 on the capital outlay.

Like the four major irrigation canals, this canal was made from funds supplied by the Government of India. It was purchased by the Local Government in 1921-22 for Rs. 45,64,692.

26. The Shwetachaung brings in 3,000 to 4,000 rupees annually, by auction of the right to collect tolls.

27. The following new waterways have recently been made in the Irrawaddy delta to facilitate communications :—

Year.		Cost.	
		RS.	
1922	Cut joining the Pyamalaw and Wakema rivers.	3,09,946	On through route Rangoon to Bassein, over one mile in length.
1924	Cut joining the Sagamya and Pyamalaw rivers.	4,36,212	On through route Rangoon to Bassein, two miles long.
1924	Cut joining the Thetke *chaung* with the Bassein river.	20,122	On through route Rangoon to Bassein.
1925	Cut joining the Einmé and Tinthet *chaungs*.	5,43,772	Short cut from Einmé to Rangoon, length 2⅛ miles.
1926	Cut joining the Kyaikpi river to the Irrawaddy near Kywegyan.	11,85,000	On through route from Rangoon to Moulmeingyun.

28. Improvements recently made to existing waterways are as follows:—

Year.		Cost.	
		RS.	
1922	Dredging the Podok creek ..	2,31,353	An important waterway from the China Bakir river to the western part of the Delta.
1925	Dredging the Pulu creek ..	5,70,006	On the main route from Rangoon to Bassein.

Improvements to waterways now in progress—

	Estimated cost.
	RS.
Widening and deepening the Pegu-Sittang Canal	14,75,203
Removing shoals in the Daga river	4,30,036

All these improvements facilitate the movement of agricultural produce to market.

III.—Embankments.

29. Embankments, for the most part, receive a credit of 50 per cent of the gross land revenue demand on the areas protected by them.

On Ela and Zwebat-Moyingyi embankments only is a drainage rate levied on the area.

30. Particulars of the embankments that are classed as productive are tabulated below:—

Embankment.	Approximate date of completion.	Capital cost.	Net revenue in 1924-25.	Area protected.	
				1901.	1924.
		RS.	RS.	ACRES.	ACRES.
Maubin Island	1880-81	8,44,372	1,37,496	123,401	139,602
Irrawaddy Embankments.					
Kyangin Section	1881-82	1,55,064	5,261	2,798	4,169
Myanaung Section	1881-82	11,93,776	1,24,847	60,504	97,162
Henzada Section .. .	1881-82	23,90,978	2,33,556	3,31,209	5,31,722
Sangin Sagagyi Section ..	1887-88	59,890	11,371	..	29,069
Thôngwa Island	1896-97	2,27,909	69,881	40,483	39,785
Ela Embankment	1916-17	14,628	1,704	..	7,382
		48,86,617	5,84,116	..	8,48,891

The figures show a return of nearly 12 per cent on the capital cost of these works taken collectively.

The Ela embankment in the Yamèthin district has recently been extended.

31. The Tamatakaw embankment in the Dadaye township of the Pyapôn district was constructed in 1925-26 at a cost of Rs. 57,115. It is intended to protect an area of 13,431 acres from inundation by the sea and is expected to bring in a net revenue of Rs. 7,000, and is classed as a Productive Work.

32. The following table gives particulars of the embankments which are classed as unproductive:—

Embankment.	Approximate date of completion.	Capital cost.	Net revenue in 1924-25.	Area protected.	
				1901.	1924.
		RS.	RS.	ACRES.	ACRES.
Sittang Embankment	1883-84	10,12,190	— 49,678	33,788	34,780
Yandoon Island	1922-23	12,68,014	48,857	..	62,697

33. In addition to the above, the Pagaing, Pegu river and Zwebat Moyingyi embankments, which were made in connection with the Pegu-Sittang Canal, protect incidentally an area of about 30,000 acres. Revenue derived from these works is credited to the canal.

There are three small works for which capital accounts are not kept, the Bilin, Kantha and Donwun embankments.

34. The Shwelaung embankment in the Myaungmya district, which was constructed in 1883-84, is really a bridle path 12½ miles long, and is maintained from funds under "41—Civil Works". Credit to the extent of 50 per cent of gross land revenue from the area protected by it is afforded to the Irrigation Department. It is not shown separately but is added to the area protected by the Henzada embankment. The cost of such maintenance work as is necessary for its strength as a protective embankment is charged to the head XIII, otherwise it is maintained as a road.

35. There are many embankments in the Irrawaddy delta which have been made and are maintained by the cultivators. The rise in flood levels has made the maintenance of these embankments more and more difficult. Breaches are common and a demand that certain of them should be taken over and maintained by Government has arisen. As the interests of the Port of Rangoon and of the existing Government embankments are involved, the whole question is to be examined by a committee. In the meanwhile Government has undertaken, as a special case, to close a large breach which occurred in 1926 in one of these embankments, as it is too extensive a work for the cultivators to undertake. They have contributed Rs. 6,000 towards the cost.

36. An estimate, amounting to Rs. 4,62,578, has been sanctioned for the alteration of part of the alignment of the Maubin Island embankment, in order to protect a new area of 10,134 acres that up to now has remained outside the embankment. Provision has also been made for improving the drainage of the northern part of the protected area. This work is now under construction.

IV.—Drainage and Reclamation Works.

37. Great attention has been paid of late years to projects for improving the drainage of areas that are liable to floods.

38. The streams that drain the Pyuntaza plain in the Pegu district have been a constant source of trouble, owing to their instability. Large areas of country are annually flooded and communications are imperilled owing to the bad state of these streams and their occasional complete change of course. The combined waters of the Yenwe and Baingda *chaungs* were confined between embankments between 1916 and 1924, in an endeavour to create a stable course for them. The scheme was successful up to a point, but the bed did not scour as was anticipated and this method of training was abandoned in 1925 owing to the constant rise in flood level between the embankments.

The system of training without embankments, evolved by Messrs. F. A. Leete, C.I.E., and G. C. Cheyne, M.B.E., on the long floating streams of the Tharrawaddy district, was adopted in 1925, under the advice and supervision of Mr. Cheyne. The results were very successful and an estimate amounting to Rs. 13,74,859 has been sanctioned to cover the cost of the work already done and future operations. The result of this comparatively inexpensive method of river training is to reclaim annually large areas of land suitable for cultivation by regulated deposit of silt from the streams.

39. The method is being applied to all the streams in the Pyuntaza plain area. Improvements to drainage form an essential part of the operations and much has already been accomplished in that direction.

40. Contour surveys of an area of over 900 square miles in the Pegu district, lying to the south of the Pegu-Sittang Canal, will be completed this year. A project for draining this extensive area, which at present suffers very much from floods, will then be prepared.

In the meanwhile action has been taken to improve the Pegu river by dredging through four loops. This work, estimated to cost Rs. 6,61,389, will have an immediate effect in reducing flood levels in the northern part of this area, and it will enable a better outfall to be obtained for the drainage of the area as a whole.

41. Extensive surveys have been completed of the flooded areas on the Gyaing, Attaran and Salween rivers in the Amherst district, at a cost of nearly 2 lakhs of rupees. The results of the survey are under the consideration of Government. The area is a peculiarly difficult one to deal with effectively, owing chiefly to the very heavy rainfall, averaging about 200 inches per annum on the whole area, but it is probable that conditions may appreciably be improved by opening out adequate drainage channels.

42. A survey of the area protected by the Myanaung embankment in the Irrawaddy delta will be taken up during the current financial year. The estimate amounts to Rs. 73,610. This area receives drainage water from the Arakan Yomas. The construction of the embankment interfered rather seriously with the outfalls of the original streams, and the greater part of the area is a swamp in the rainy season. It is anticipated that the construction of a proper drainage system, combined with scientific reclamation on the lines adopted in the Pyuntaza plain, will greatly benefit the agricultural situation in that area.

43. An area known as Bawle Island in the Insein district has been suffering severely from floods in the Irrawaddy during the last few years. There is evidence that the channels which drain this area have deteriorated, and an effort is being made to improve conditions before the flood season of 1927, by digging out and straightening those channels, and by blocking the mouths of channels through which the flood water enters the interior of the area. The estimated cost of these operations is Rs. 29,433.

44. Surveys are in progress for the improvement of an area on the left bank of the Sittang river, Toungoo district. It is probable that improvement will be effected by drainage, combined with reclamation by controlled deposit of silt.

45. The construction of embankments was undertaken without adequate provision of drainage channels for the area protected, even where the natural streams were blocked by the embankment. Cases of flooding due to this cause are numerous and in some cases the flooded area is of considerable extent. If the additional staff, which has been asked for and shown in paragraph 47, is sanctioned, it is proposed to form a special division to get out projects for remedying these defects.

V.—General.

46. The hydrographical statistics of the Province are in course of being collected and collated. Great importance is attached to this work as the preservation and the concentration of these records in a form in which they will be readily available for reference will be of the greatest use to the irrigation engineers of the future. They will also be of value for the water-supplies of towns.

47. The work of the Irrigation Department in Burma has outgrown the capacities of the sanctioned establishment, and application has been made to the Government of India for sanction to a very necessary increase in the cadre of the Indian Service of Engineers. In 1901 the establishment comprised one Chief Engineer, who dealt with the roads and buildings also, and one Irrigation Circle of superintendence. At present there is one Chief Engineer for Irrigation and three circles of superintendence, one of them temporary. Application has been made for the establishment of four permanent circles.

Oral Evidence.

63580. *The Chairman:* Mr. Stuart, you are Chief Engineer, Public Works Department, Irrigation Branch, Burma?—Yes.

63581. Are the problems of the Irrawaddy mainly problems of conservancy rather than of irrigation?—Entirely so.

63582. River conservancy?—Yes; no irrigation is done from the Irrawaddy.

63583. Irrigation on a grand scale is not a proposition in Burma?—It is not practicable.

63584. Do you think it is likely to be, in the future?—No, the physical characteristics of the country absolutely preclude it.

63585. What, exactly, are your responsibilities in the matter of navigable channels?—The Irrigation Department is responsible for the maintenance of all navigable channels which have been declared main waterways by the Local Government.

63586. How far down does your charge extend?—Down to the sea.

63587. Are you dredging at all?—Yes.

63588. That is all under you?—Yes.

63589. Is the problem of the water-hyacinth also within your authority?—Yes.

63590. We have been informed that the water-hyacinth is a very serious menace in certain districts?—Certain channels are very badly blocked with it.

63591. Have you noticed any signs, anywhere, of a natural decline in the vigour of the water-hyacinth?—No; but I do not think that it has been increasing of late years; it seems to have remained much the same.

63592. Is that because it has already occupied all the suitable environments?—Possibly that is so.

63593. Do you feel that this problem of water-hyacinth, remembering that it is a problem which is threatening Bengal probably more formidably than it threatens Burma, is one which might be taken up on an all-India basis?—I certainly think so.

63594. It is a problem of much importance in certain districts in the United States; is it not?—I believe so, and also in Australia.

63595. So that it is very important, if research on a considerable scale is undertaken, that information from all over the world should be collected?—That is very important, I think.

63596. In the nature of things it is work which should be wholly undertaken by some special central body?—Yes.

63597. The Irrawaddy is, I think, an excavating river, in the main, is it not?—I am not quite sure what you mean.

63598. Broadly speaking, I understand that a distinction is made between those rivers which are excavating and those rivers in which the balance of tendency leads rather to a deposit of silt in the river-bed from year to year and so to the building up of land?—The Irrawaddy is not excavating its bed; it is building up the delta. It is more in the nature of a building-up river. The whole delta, as a matter of fact, is in the process of being built up.

63599. Built out into the sea?—Yes, and up-stream as well.

63600. Is there any indication as to the rate of movement of the river in the lateral direction across the deltaic tract?—I do not think so, because the waters of the river are spread in many streams all over the delta and each of those streams is doing its own work of building up.

63601. Unless, in their aggregate effect, between them they manage to traverse the breadth of the deltaic tract, how can the silt be deposited, and how can the land be raised from century to century?—The land is, of course, raised only during the high floods, and in high floods the river-water spills over the whole area of the delta, except such as have been protected by embankments.

63602. Silt is distributed over the whole breadth of the deltaic tract?—Yes, I think the distribution of silt is fairly even over such areas, except in those where the natural tendency of the river has been interfered with by the hand of man.

63603. As regards those areas where interference has taken place, are you satisfied that that interference has been in the interest of the population as a whole?—It has been in, what I call, the immediate interest of the population; but the works that we have put up (the embankments) cannot possibly be of a permanent nature. They are to the interest of those people who are actually under the protection of the embankments themselves but they are to the detriment of the areas which are outside the protection of the embankments, because they have forced up the flood levels and rendered such areas unculturable.

63604. Do you think there has been any ill-effect upon the sanitary conditions of those areas, owing to the interference with the drainage?—I do not think so.

63605. Not in the case of the Irrawaddy?—No.

63606. Where the river has been constricted by *bunds*, has there been any tendency for the river-bed to rise?—The records that we have got show no such tendency.

63607. So that, the extra scouring as a result of the concentration of the river probably counterbalances the extra silt deposited as a result of the constriction of the river in the slack season. Is that view sound?—I would put it this way; the volume of water brought down by the river changes enormously during the year (in the dry weather it is very small: in the rains it is enormous), and the consequence is that silt is deposited in the dry weather because the river-bed is too big for the amount of water it carries.

63608. If the scouring action were greater than the silt-depositing tendency, the river-bed would presumably tend to lower; do you think

that an approximate balance is being maintained between the two tendencies?—Yes, except in the higher reaches of the delta, at the apex, where the river-bed has been definitely scoured. Lower down where the delta widens out there is no material alteration to be traced.

63609. We are told that the deposit of silt on agricultural land has a very valuable manurial effect. Would you be able to increase the deposit of silt in agricultural lands by means of sluice gates in the embankments?—It is possible; but I think it would be rather difficult. It could only be done during the flood season, and that is the season when the paddy is growing and consequently if we had sluice gates sufficiently large to admit a flow of water sufficient to give a coating of silt, we should simply wipe out the crop. There is another difficulty about sluice gates, and that is, that the river is constantly encroaching on its banks, and the sluices would be liable to be washed away at any time.

63610. Are you familiar with conditions in Bengal?—No; I have not been in Bengal.

63611. Is it your view that further research into, and study of, these natural forces and their results ought to be undertaken and a policy fixed upon; or do you think that everything is known about the tendencies of the river?—I think personally, as far as the Irrawaddy is concerned, enough is known to show what has to be done. The facts seem to be clear to me.

63612. Except in the season of flood the river continues to act as a drain for the country through which it passes?—Yes.

63613. Are you responsible for irrigation by tube wells?—We do not do it.

63614. But if tube wells are to be sunk which department is to be responsible?—I think the Irrigation Department should do it. I think in areas where irrigation is wanted, it will be extremely difficult to find water by means of tube wells.

63615. Has any water-survey been made of the dry tract?—No regular survey has been made, but wells have been sunk here and there and the results are not satisfactory.

63616. What type of wells?—Tube wells.

63617. What depth?—Two hundred feet.

63618. Is there any case of a satisfactory supply of water in the tube wells in the central tract?—I know of no case in any area where it is possible to irrigate from tube wells.

63619. Would you regard with favour any suggestion to divide the responsibilities between two departments, one to deal with conservancy in the lower delta, and navigation, and the other with navigable channels and irrigation?—I think the amount of purely irrigation work in Burma is so small that it is really hardly enough to occupy a separate department, and I think one department can manage both matters.

63620. Are you definitely in favour of undertaking the removal of certain *bunds*?—That is what I am recommending to Government. I think a gradual process of removal should be undertaken.

63621. Has any vested interest established itself behind these things; is there property at stake?—Yes.

63622. Of what nature?—It is all agricultural land.

63623. Assuming the experiment to be successful, would a certain amount of damage inevitably follow the removal of these *bunds*?—Yes.

63624. Of what nature?—The areas protected by the embankments would be gradually reduced.

63625. On the balance, it would be the proper course?—On the balance, I think it is the best remedy that can be found, because the flood levels would be gradually lowered, and unprotected land which is annually flooded would become safe for cultivation.

63626. At page 241 you mention that an experiment was made in 1904 of handing over minor irrigation works in the Sagaing district to the cultivators. What is the view of your department as to the advantage of that move, after twenty-three years' experience?—Our view is that these minor irrigation works are so small and insignificant that it is unnecessary for Government to undertake their maintenance.

63627. Has deterioration arisen as a result of their being handed over to the cultivators?—I do not think so. These minor works consist of small tanks; they were in a very bad state when we handed them over, and I do not think that they are in any worse state now.

63628. In the early part of your examination, you gave us your view that the general tendency of the river was stable on the whole; how is that to be reconciled with the rise of the flood levels which appears to have taken place and which is described in paragraph 35, page 248?—The rise in flood levels in the delta is due almost entirely to the construction of the Government embankments; it is an artificial rise.

63629. Are there any signs of stabilisation?—I do not think so. The floods have been rising of late years, but at the same time private embankments have also been rising and extending sufficiently to account for it.

63630. There are, I think, many small schemes or devices now being used for irrigating limited areas of cultivation. Your suggestion is that the cultivator is well able to look after himself in this respect?—I think so.

63631. On the other hand, if that be accepted, do you not think that the cultivator might benefit from technical advice, as to how best to construct such schemes and to maintain them when constructed?—Certainly, he would.

63632. Is your department responsible for that?—We have had no applications of that nature, as far as I know.

63633. Do you think it sound policy to wait for applications from folk who are after all very small men and unlikely to come and see you in your official capacity, or do you think, *per contra*, that you should get into touch with them, help them, and offer them technical advice?—You are thinking of well irrigation?

63634. Irrigation and drainage: I think they go together. Is not that right?—With regard to drainage, of course, we have several applications, and we always look into them, but as far as irrigation goes I do not think that the Burman will take to well irrigation.

63635. I suggest to you that, having regard to your heavy responsibilities in larger matters, it may be that there is a case, for placing these minor works, and the duty of affording technical advice to cultivators and of devising and maintaining such schemes, in charge of a special officer, whose duty it would be to move about the country, not merely to answer questions, but to stimulate interest in such schemes?—As a matter of fact, we have got an officer in the Sagaing district, who is looking into the question of restoring one or two old tanks.

He need not be a whole-time officer. It would be enough if he were one who would give his heart and enthusiasm to it.

63636. *U Ba Cho:* In Lower Burma, we have floods practically every year?—Yes.

63637. Sometimes, they do an enormous amount of damage to the paddy cultivation?—Yes.

63638. During the last few years, we have had two committees appointed to enquire into the causes of these floods?—Yes.

63639. And reports have been submitted to Government?—Yes.

63640. Is your department acting on some of the recommendations made by these committees?—Yes. My department has already acted on a great number of them. It is impossible for us to deal with all of them with our present staff, but we have asked the sanction of the Secretary of State to an increase of staff, which will enable us to deal with them. They will then be taken up by a special circle formed for that purpose.

63641. There are many big bends in the course of the river Sittang. What steps have you been taking to improve the channel? I hear that you have cut some of these big bends, thereby reducing the length of the river?—Yes. It is rather a dangerous business to cut loops in a river like the Sittang, because it is about the most unstable river that I know, and if we cut loops short-circuiting the river, it is extremely probable that in a very few years those loops will re-form somewhere else.

63642. *The Chairman:* Exactly what do you mean when you say that it is the most unstable river that you know of?—It has wandered over the

country over a width, I suppose, of something like twenty miles, at various times. The whole of the Sittang valley is full of depressions which are nothing but old beds of the Sittang.

63643. *U Ba Cho:* I have called the loops bends. By cutting the big bends you will expedite the flow of the river and thereby reduce the flood level of the river?—Yes, quite so. But, at the same time, you will almost certainly destroy some lands somewhere else by causing another loop to form very rapidly, and the situation comes back to where it was before. It would certainly make a temporary improvement, but I feel a little doubtful as to whether it should be undertaken. As a matter of fact, a proposal to that effect has recently been before me, and I am considering it.

63644. *The Chairman:* Is it the natural tendency of a river of that sort spontaneously to adjust its length according to the volume of its water in relation to the fall of the land, and to do so by developing loops?—Yes.

63645. *Mr. Calvert:* I gather from your memorandum that the irrigation works in this Province are comparatively cheap. They work out at about Rs. 35-8-0 per acre irrigated for capital cost; Rs. 2 for maintenance charges, and your receipts are Rs. 5 per acre irrigated. Is that correct?—Yes.

63646. So that, the lack of expansion is simply due to lack of opportunity, and not to the cost?—It is absolutley due to lack of opportunity.

63647. You say that the old system of charging a separate rate for the use of the water has been discarded in favour of a consolidated rate. Has that led to a reduction of irrigation revenue?—No. The irrigation credits have been worked out in such a way that they are not reduced by the change.

63648. But I gather that the revenue is taken only on matured crops?—Yes.

63649. What agency do you have to say which particular acre is irrigated and which particular acre is not irrigated?—We have a combined staff of surveyors under the Superintendent of Land Records and the Executive Engineer, who measure up all the irrigated fields. In certain cases, such as the Meiktila lake, the area taken as irrigated is practically a fixed area, and although all of it may not get water poured upon it, it is assumed that it receives benefit from the moisture beneath the ground in the neighbourhood.

63650. Is your department satisfied with the irrigated area recorded by the Land Records Department?—Yes, we keep a very close check on it.

63651. With this system of a consolidated rate, there is removed from your department any incentive to make a more economical use of the water available by spreading it over a larger area. Is that of any importance?—I do not think it has that effect.

63652. The reason being that you have got a certain limited area which you can fully irrigate, and there is no question of spreading the water over a larger area?—If we spread it over a larger area, we get revenue credit for it. Our credit is not confined to a fixed area.

63653. The consolidated rate also varies per acre irrigated?—Yes. It varies according to the soil classes.

63654. As far as you know, this consolidated rate does not result in your department being any the less actively interested in the economical use of water?—Certainly not.

63655. In paragraph 17 on page 243, you say that the Canal Revenue staff has been amalgamated with the Land Revenue staff. Is that working satisfactorily?—It has worked very satisfactorily in the Shwebo Canal, which is the only instance in which we have had any experience to go upon. It has rather resulted in increased revenue.

63656. You know, of course, of the controversy on this point in the Punjab. The Irrigation Department are bitterly opposed to this proposal which, you say, works well here?—Yes.

63657. Does this change tend to divorce you as an engineer from the financial aspect of your works? You simply do the actual engineering, and the Revenue Department take the proceeds?—No, I do not think so. We

keep a close watch on the financial aspect, and we are very jealous to see that we get our proper credit.

63658. Presume, for a moment, that one of your productive works was showing signs of a reduced return, not paying its interest and maintenance charges, would you have the same opportunities for revision of your system, so as to get more economic rates, with this amalgamated staff?—Revision of the rates?

63659. A more economical use of the water, when you work it through the staff which is under another department?—*Mr. Reynolds:* It is a very complicated system worked by the Irrigation and the Revenue Departments together.

63660. *Mr. Calvert:* Has the Irrigation Department swallowed the Revenue Department, or the Revenue Department swallowed the Irrigation Department?—*Mr. Reynolds:* It is an experiment to see if we cannot reduce the expenditure and save money?—(*Witness*) We keep a very close watch on the work of the surveyors.

63661. *Mr. Calvert:* In the Punjab, the Irrigation Department will not accept the Revenue Department's figures of the area irrigated. The two staffs send quite different figures of the area irrigated in the year under the same canal, the Irrigation Department's area being always larger than the area as reported by the Revenue Department?—We found that to be the case but in Burma we have two separate staffs of surveyors. All that is done is to point out to the Superintendent of Land Records the discrepancies and get them adjusted. We generally found that we were right.

63662. *Mr. Reynolds:* You spoke about the effect of the embankments in raising the flood level and making certain areas that had been cultivable uncultivable. I have heard it suggested that the first effect of the embankments was to induce people to cultivate areas that had been uncultivable. Then, towards the end of the season, the flood coming through the breach washed them out. It was not really old areas that had been rendered uncultivable so much as areas that were being occupied before they were really high enough to cultivate. Have you any evidence on that point? In Insein, I have heard that said?—Yes, it is most probable. At the same time the effect of the embankment is to raise the flood levels and to decrease the amount of cultivable land on the unprotected areas.

63663. Can you think of any tract of country at present not irrigated, where an irrigable area of, say, a hundred thousand acres, could be irrigated?—There are areas to the west of the Samon up to Ava in the Sagaing and Kyaukse districts where you could get a hundred thousand acres but, as I remarked in my note, the cost of providing water for irrigation will be prohibitive.

63664. Is it a fact that every big Public Works Department irrigation work existing in Upper Burma has practically followed the levels of the older Burmese works?—It is so with one unfortunate exception.

(The witness withdrew.)

Mr. L. DAWSON of Dawson's Bank, Limited, Rangoon.

Replies to the Questionnaire.

QUESTION 5.—FINANCE.—(*a*) The extension of banking facilities to rural areas seems to me the best way of improving financial conditions in agriculture, inasmuch as capital is thereby attracted to the industry. There is a field for co-operative banks, land mortgage banks and joint stock banks. The last-named can operate with advantage in the delta where crops are secure and land is easily marketable.

The following quotation from Dawson's Bank's Report for the year ended 31st October 1923 bears on this point :—

"*Bank Lands.*—An interesting feature of the present balance sheet is the disappearance from it of agricultural lands as a bank asset. All these have been sold and the bank does not now own one acre of agricultural land. Land mortgage banks all over the world from time to time have had to take over the land given in security in lieu of payment and in most of their balance sheets this item has figured very conspicuously, perhaps too conspicuously; because agricultural land is not, as a rule, an easily realisable asset. But this is not the case in the delta of Burma, as was pointed out to the Indian Industrial Commission by Mr. A. E. English, C.I.E., I.C.S., and our experience has proved the correctness of his statement. Altogether there were eleven cases of foreclosure since incorporation (mostly occurring during the War) and the accounts show that the lands foreclosed had loans outstanding against them aggregating Rs. 83,276 and realised on balance a clear profit to the bank of Rs. 37,630 and, while in the bank's possession before realisation, yielded a net return of 25 per cent on the amount advanced.

"The return was so good that it did not pay the bank to sell these lands but it is not the policy of the bank to hold land except temporarily and the bank did not wait for top prices.

"The value of this experience is hard to estimate; for, it ought to have an all-important bearing on the problem of securing for the agriculturists of Burma much better financial conditions than have hitherto prevailed."

In other parts of Burma where crops are less secure and land is not easily marketable the financing of long-term credit should be undertaken by land mortgage banks who get their money from the public, not by means of deposits, but by means of long-term debentures.

Short-term credit can be dealt with suitably by co-operative banks and by joint stock banks but the difficulties in the way of financing produce are considerable. It is not easy under the present conditions to obtain good security. Even with land as security there are sometimes risks. The absence of a record-of-rights makes it difficult to be sure about title and the investigation of title is sometimes a long and laborious proceeding.

The district bank advances against produce (1) when the substantive security, *viz.*, land is mortgaged to the bank, and (2) when the produce is handed over to the bank in trust for sale.

(*b*) No. Extension is not desirable but retention of the present facilities is useful.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—(*a*) (*i*) Rinderpest among cattle.

Thriftlessness and craving for novelties.

Religious festivals and ceremonies.

Malaria and sickness.

Litigation.

The want of banking facilities.

Comparatively high standard of living of Burmese peasant.

(*ii*) The village moneylender.
The *chetty*.
Co-operative credit societies.
Banks.

(*iii*) See (*i*).

(*b*) Better certainty of repayment would automatically lower rates of interest. Banks formed by private enterprise are, in my opinion, better calculated to control the loans they make.

(*c*) No.

QUESTION 24.—ATTRACTING CAPITAL.—(*a*) Change in Government policy and recognition of existing facts—the zamindari system in the delta.

(*b*) Uncertainty of tenure.

Want of co-operation among landowners.
Want of banking facilities.

Oral Evidence.

63665. *The Chairman:* Mr. Dawson, you represent Dawson's Bank?—Yes.

63666. Is it your view that, broadly speaking, joint stock banks are the proper instruments for the provision of long-term credit for cultivation?—In the lower delta I think they are, but they must specialise in long-term deposits.

63667. Do you regard it as essential that each applicant for a long-term loan should have his claim to be a suitable person to receive such a loan most carefully examined?—Yes.

63668. You have to satisfy yourself not merely that the security which the man gives is sufficient but also that he is a type of man who wishes to repay?—In other words, we inquire into his character as well as his means.

63669. What agency do you employ for these inquiries?—We have branch managers who make these inquiries themselves. In the head office I conduct them myself. In my absence the general manager does it.

63670. Does the manager of the branch himself see the cultivator?—Yes.

63671. And satisfy himself as to the credentials of the man?—Yes.

63672. How many of these loans have you issued, approximately?—I could not tell you.

63673. Could you give us some indication? Accuracy is not important but we want to have some idea of the scope of your operations?—We have about 7,000 clients.

63674. Taking the average client, is much known about him before the inquiry is made? Does your branch manager as a rule know the cultivators pretty well?—Yes. The branch manager is very often chosen because of his local knowledge.

63675. From what profession do you draw your branch managers?—We do not insist on any professional qualification, though most of them happen to be lawyers. They are useful in investigating titles.

63676. Are any of them moneylenders?—Not to my knowledge.

63677. Are there any reasons why the deltaic tract should be the most favourable for joint stock enterprise?—The two main reasons are that the crops are secure, which means that you get regular interest payments, and that the asset is readily marketable.

63678. What rate of interest do you charge?—The average works out to about 14¼ per cent.

63679. Over what length of time is the loan made?—We have two classes of loans; one is the short-term loan and the other is the long-term loan. The long-term loan is repayable over a period not exceeding ten years. The short-term loan is repayable within a period not exceeding nine months.

63680. One crop?—Yes.

63681. Does the 14¼ per cent apply to the ten-year loan?—It applies equally to both.

63682. You charge approximately the same rate of interest for short as for long-term loans?—We look more to the quality of the security than to the duration of the loan.

63683. Has your bank, as the result of foreclosing, owned any important areas of agricultural land at any time in the bank's history?—No; certainly not. The only land that we possessed is the land that I have referred to in my note. Since the note was written some land has come into our possession but it cannot be described as an important area.

63684. You describe it as the policy of your bank to sell such land as soon as possible?—Yes.

63685. Although, *prima facie*, it appears to pay you to hold the land and cultivate it?—Yes.

63686. I suppose you cultivate it by tenants on the produce rent basis?—Yes.

63687. Why is it the policy of your bank to sell lands which come into the hands of the bank as a result of foreclosure?—Because we are not out to be landowners; we are out to be bankers. We do not wish to acquire land with the object of making profit out of a sale. We would like to keep our funds as liquid as possible.

63688. That is from the purely business angle. Is there any difficulty felt in the way of management?—No, the management is not so difficult as to be an impediment.

63689. I take it it is no pride of profession which persuades you to sell land? You do not think that it is good business to hold it?—We think it is bad policy.

63690. Why?—Because land may not always be easily marketable.

63691. Are you frightened, at all, of the effect upon public opinion if a bank were to own important areas of land?—That has not operated to induce us to sell.

63692. It is the uncertainty as to the realisable value?—Yes, to a large extent that is so. Of course we are aware that the Government policy is against non-agriculturists holding land, and no doubt it would react unfavourably on the bank.

63693. Are there any other reasons which have dissuaded you from holding land?—The question of management would become a very serious business if we had large areas under our control. It would divert us from our main purpose, namely, that of financing agriculture.

63694. Would you describe exactly how, in your view, this decision at which you have arrived, in regard to the sale of land, ought, as you say, to have an all-important bearing on the problem of securing for the agriculturists of Burma much better financial conditions than have hitherto prevailed?—People in the towns do not know much about agricultural land. They are generally guided, in their opinions, by bankers in cities, and they take a very unfavourable view of agricultural land as security for money. It was not considered to be much of an attraction as a liquid asset. A banker in Rangoon once told me that he considered it to be a liquid asset only in the rains when it was covered by water.

63695. Do you think this lead which you have given should encourage public opinion to regard land as a sound investment?—I do.

63696. Have you full records as to what your clients do with the money lent on long-term?—We make a point of seeing that the money is appropriated to the purposes declared.

63697. How do you ensure that?—We get them to prove it to us.

63698. You favour the operations of the Land Mortgage Bank, provided what you regard as sound principles are followed?—Yes.

63699. You think that the money should be got from the public in the form of debentures and not deposits?—Yes.

63700. On the sound principle of borrowing for long-term loans?—Yes; you cannot finance long-term credit with short-term money.

63701. Do you secure any short-term money on movables?—Yes, we advance against produce.

63702. And cattle?—No; it is a make-weight. We never advance against cattle unless there is other security as well.

63703. Does the risk of rinderpest seriously reduce the credit possibilities of the cultivator?—Yes, it does. Death due to rinderpest is extremely common and the cultivator very often has all his herd destroyed by rinderpest.

63704. In cases where short-term money is secured on produce, do you have to take legal proceedings, in many instances?—No. What happens is this: we only advance against produce when the borrower has given us the substantive security of his land as well. That is one case. There is another case in which we advance against produce when he hands over his produce for sale.

63705. But where you do find credit on the security of produce, does that amount to a legal obligation in this country?—It is a very indefinite one; that is the trouble about advancing against produce.

63706. Is the absence of a record-of-rights another limiting factor as regards credit?—Yes, a great deal of time has to be spent in investigating title.

63707. I gather that you invite Government to recognise existing conditions, that is, the zamindari system which is in vogue in the delta?—Yes.

63708. Meantime, is it your view that that is not recognised?—Yes; Government's policy is to promote the interests of the small holder.

63709. What do you mean by 'recognising the zamindari system'? What steps should Government take?—If Government were to announce that its policy had been altered, that it no longer regards the small holder in the delta as the person to whom all others should bend, it would, I think, attract the man with capital.

63710. Do you think it is in the public interest that that change in the Government's attitude should take place?—Yes, in the delta where the facts exist; one must accept the facts as they stand.

63711. Is the use of the cheque on the increase in Burma?—We found it extremely difficult to introduce it, but it is growing and a dacoity is to us what a fire is to an insurance company. It affords opportunity for propaganda and we generally get two or three new accounts as a result of a dacoity. We try to dissuade people from burying their money in the ground and from keeping it in insecure houses. If and when a dacoity does take place we can say to them: "We told you so; you would have been much wiser had you lodged this money in the bank".

63712. You do no insurance business, do you?—Yes, in a general way. We act as insurance agents.

63713. Is insurance on the increase?—Yes, we are able to get people to insure who borrow money on produce while it is under mortgage.

63714. Are premises worth insuring?—Only in towns. There is good insurance business in rice mills.

63715. Rural dwellings are not insured?—It is almost impossible to get cover because of the surrounding houses which are generally thatched.

63716. Do you do any cattle insurance?—No.

63717. Any crop insurance?—No, except when it is held as a security and handed over to us for sale.

63718. Is it your view that there is a future for the co-operative movement in Burma?—Recent reports indicate a set-back. For many years there was considered to be a great future for the co-operative movement.

63719. Do you regard co-operation as a formidable competitor of the joint stock bank?—No, except that we are all out for public money; but in the lending department we act in complementary fields. The joint stock bank necessarily finances the big man or the man with pretty considerable or tangible security.

63720. Have you ever done business for the co-operative society?—No, we have offered to do so.

63721. Advance money for long-term loans?—No, short-term money.

63722. *Sir Thomas Middleton:* You advance money for both short and long terms at the same rate of interest?—Not necessarily at the same rate of interest. I said that that average rate applies equally to long-term and to short-term loans. The rate of interest is regulated by the quality of the security in each case.

63723. Assuming the quality of the security to be the same, would you charge the same rate of interest in the case of the short-term as in the long-term loan?—Yes.

63724. Do many of your long-term loans extend for as long a period as ten years?—Yes; legally they are payable on demand; and at the time the application for the loan is made we tell the borrower that we are willing to accept payment in instalments and the amount is fixed.

63725. You endeavour, in the case of long-term loans, to get repayment by instalments?—Yes.

63726. So that at the end of the period, the amount outstanding is small?—Yes.

63727. That is to say, you act as if you were a land mortgage bank?—Yes, in our long-term loans.

63728. There is a clear distinction between a land mortgage bank and a joint stock bank, and you give us a case where you became possessed of land which, in order to divest yourself of the responsibility, you sold?—Yes.

63729. But, you say the joint stock bank system is suitable for the conditions of Lower Burma and not suitable for the conditions of Upper Burma?—I think it is certainly more suitable to the conditions that obtain in Lower Burma than to those in Upper Burma. It might be suitable to Upper Burma, but it is certainly more suitable to Lower Burma.

63730. If joint stock banks took over all business in areas where land is easily saleable and where there is no difficulty in recovering, what would happen to land mortgage banks which were left with only those districts where difficulties arise? As far as Lower Burma is concerned joint stock banks might meet the needs of agriculture and your suggestion seems to be that land mortgage banks should be confined to Upper Burma?—I do not suggest that land mortgage banks should be excluded from operating in the delta.

63731. Is litigation a serious cause of indebtedness in Burma?—It is, I think.

63732. We have had this explanation for indebtedness in India, but I do not know the conditions in Burma?—It is the same here: litigation, criminal and civil.

63733. You have been lending money at 14¼ per cent interest under certain conditions. Now, in the same area you must have come into competition, in the course of your business, with the *chetties* who have been lending money at the rate of 30 per cent?—Yes.

63734. Have you noticed that when you open business in any particular area, there is any marked decrease in the rate of interest in that area?—Yes; it has certainly gone down.

63735. I think you said that your business was confined to Lower Burma and did not extend to Upper Burma?—Yes; Lower Burma or rather in the lower portion of the delta; we are not operating all over the delta.

63736. *The Chairman:* Do you lend money to moneylenders?—No. It is very hard to discriminate sometimes, because a landowner is also a moneylender, and of course we cannot refuse to lend him money; but we do not lend money to men who do a professional moneylending business. I am afraid many of our advances do filter through to other moneylenders who act as middlemen.

63737. *Mr. Calvert:* Your bank is now a joint stock bank?—Yes. It always has been.

63738. Public or private?—It was a private company when first formed; it is now a public company.

63739. What is the total paid-up share capital?—The paid-up capital has recently been increased; it is now 7½ lakhs.

63740. What is the total of the assets by way of promissory notes and bonds?—The gross total of the assets column in the latest figures is ninety lakhs; the actual amount of money outstanding as loans must be less than that.

63741. What will it be; sixty lakhs?—Somewhat under that; it has increased very largely in the last two years. The latest figures indicate fifty-seven lakhs.

63742. These people, with whom you are dealing, are mostly substantial landowners?—Yes.

63743. And the security you take is mainly mortgage of the property?—Mortgage of the land, and the crops are also included; but we look to the land as the substantive security.

63744. Do you find the same person coming back to you for further business, or do you get new clients every year?—Do you mean when he pays up the loan?

63745. Yes?—Quite a large number of the loans are paid up and they take new loans. We also get new clients every year.

63746. So, the question of examining titles only comes up in the case of a new client?—Yes; or when an old client buys new land, which frequently occurs.

63747. Do you find much trouble in getting the mortgage deeds registered?—No; but we have great trouble in investigating the titles, which is done free of cost to the client.

63748. Do you find your clients adhering to the terms of the bond or always applying for renewals?—A long-term loan is payable in instalments, so the question resolves itself into this: whether they make defaults in their payment of instalments?

63749. Yes?—They do; a quarter of them make defaults.

63750. Do you take from them a demand note?—There is a registered mortgage bond.

63751. But the loan is payable on demand?—That is the stipulation in the bond; all our bonds are drawn up in that way. Some of our bonds are also drawn up in terms of amortisation.

63752. But they take the loan on the understanding that it should be repaid by instalments over a considerable period?—The right to demand the whole of the principal money is never exercised. There may arise exceptional circumstances when it would be exercised.

63753. Have you much trouble with defaulters?—Not much trouble with defaulters; we have a very high standard of repayments.

63754. Are you training Burmans to take part in this business?—Yes.

63755. Do you find that they accept the principles of sound banking in a serious spirit?—I do not know what you mean by that.

63756. Sound banking demands a system of punctual repayments; do they regard this as a sound principle?—There are orders which they have got to obey; I do not know what private opinions are held in the matter. I rather think that they agree that they are sound.

63757. I think the difference between your business and that of a *chetty* is that you want to do sound banking business, but a *chetty* does not care for the repayment of the loan; he only wants to have the man firmly in his grip to ensure payment of interest?—I think the *chetty* is quite a useful man, and I do not think he is necessarily hard on his clients.

63758. Not necessarily hard on his clients; but his outlook towards his client is not that of a sound and enlightened banker?—He looks more to his assets than an agricultural banker should; he only cares for the realisable value of the security; he is not concerned to see that the money borrowed is applied to the purpose for which it is borrowed; and I think he rather encourages the man to borrow to the full value of the security and does not care much for payment by instalments. In all these matters he offends against the canons of sound agricultural banking.

63759. He likes to have his client indebted to him for generations?—Yes.

63760. As a whole, banking on European principles has taken no root, except in a few odd cases in the Punjab and, I think, in Bombay; as a matter of fact, in the rest of India there is no joint stock banking. The fact is, Indians have not taken to sound banking principles. Do you think the Burma bankers really take to these principles of banking?—If one takes the loans they themselves make as an index one concludes that they do not apply sound banking principles.

63761. How many branches have you?—Nine, including the head office.

63762. And, in the delta only, is there considerable room for expansion?—Yes; the delta has, roughly, an area of 25,000 square miles, which is more than double the area of the Nile delta *plus* the cultivable portion of the Nile valley.

63763. Are your branch managers prohibited from lending on their own account?—No; we do not prohibit them; if we did I do not think we could secure their services.

63764. You told the Chairman that you exercised great supervision to secure the employment of the loan for the purpose for which it was taken?—Yes.

63765. Do you regard it as effective?—Yes, generally.

63766. In what way is that done? What is the machinery?—If the man borrows money, say, for the purpose of purchasing cattle, we send a man down to see whether the cattle have been bought at the date that he is expected to have completed his purchase. We follow him up and cross-examine him about how he spent his money. Very often, it is quite easy to get very definite proof of how he has spent his money. Of course, if he has not spent the money in accordance with his declaration, he gets a bad mark, and we might reconsider his credit. In the large majority of cases loans are wanted for redemption of mortgages. The proof in these cases is automatically furnished.

63767. You have here an experiment of a kind which is usually regarded as not practicable, and you have made a success of it. But the supervision and the dealing with a scattered lot of landowners must make your expenses rather more heavy than that of a purely commercial joint stock bank?—Yes.

63768. Have you ever worked out what it costs the bank to lend the money?—No, I have not worked that out. Of course, we do a lot of work without charging for it. If a client applies for a loan, he pays nothing for the valuation of his property or for the investigation of the title.

63769. What do you charge the borrower? You have got to pay the bank manager and the supervisors?—We have got to employ valuers, people to investigate the title and draw up the document. All that is done by our own men. I have not worked out the cost per loan.

63770. Is that cost an extra cost which an ordinary commercial joint stock bank has not got to meet?—Yes.

63771. Your kind of banking cannot be done without incurring the cost of these enquiries?—No.

63772. You cannot give us an idea of the cost?—I cannot give you an idea of the cost per loan. We would find it difficult to induce cultivators to deal with us if we made any charges in these respects.

63773. I understand that you yourself, or your bank, would regard litigation as disastrous?—Yes. I mean, if it had to be resorted to generally.

63774. You avoid going to the civil court?—We deprecate it.

63775. You can recover your loans without being forced to go to the civil courts?—Yes, more often than not.

63776. Do you find that civil courts are effective measures for recovery of loans?—The method is effective in the long run, but it takes time.

63777. All that adds to your costs?—Yes, but these are generally recovered.

63778. *Mr. Reynolds:* You say that your operations are confined at present to the south of the delta?—To the lower delta.

63779. That is an area of absolutely secure rainfall?—Yes.

63780. Are you consciously trying to restrict your operations to a belt of land having absolutely secure rainfall?—We would open branches anywhere in Burma, but I do not know whether we would advance or invest everywhere in Burma. We would probably go to other fields, if the field in which we were operating successfully was worked out. But there is no need for that at present.

63781. *U Ba Cho:* How long have you been in Burma?—Since 1899.

63782. Do you find that the standard of living amongst the Burmans is going up?—Yes, I think it is.

63783. Is the rise in the standard of living proportionate to the increase in their income?—I am afraid it is not always so.

63784. Is it so generally?—When I spoke of the high standard of living, I was comparing the Burman tenant or labourer with the Indian tenant and the Indian labourer.

63785. I ask you whether, in recent years, the standard of living has gone up?—I think it probably has.

63786. Do you find that the average borrower is quite honest, and that he really makes an attempt to pay up a loan?—Yes. Of course, when you say the average borrower, you do not mean the average applicant for the loan. You mean the average client who deals with the bank, and has stood the test which the bank applies?

63787. Yes?—In such cases they really make an attempt to pay up the loan.

63788. Do you consider fifteen per cent about the highest that an honest cultivator can pay for his loan?—It is a high rate. But I have known many instances where cultivators have paid twenty-four per cent, and redeemed their loans, from *chetties*.

63789. I am asking your personal opinion. Personally, you would not like to charge more than fifteen per cent to the cultivators, knowing their circumstances?—No. We would regard that as a high rate.

63790. *The Chairman :* In fairness to the other moneylenders, it ought to be pointed out that you take the cream of the security?—Yes.

63791. You would not work on a fifteen per cent basis in the case of the dry tract?—No.

63792. *U Ba Cho :* Joint stock banks are very shy of dealing with landowners from the districts?—Yes, where there are no branches. We would be rather reluctant to advance money in the districts where we could not control the loan.

63793. Do your clients make use of long-term loans, or do they concern themselves with loans for short periods?—Quite a number take advantage of long-term loans.

63794. You give loans for as long as ten years. Are the terms stipulated at the time of the loan, or is it extended from time to time, if the client is not able to pay?—It is not extended from time to time.

63795. From the very beginning, you have it extending to ten years?—Yes. When a client applies for money for purposes of redeeming a mortgage, or building a house, or buying further cattle, we do not expect him to repay immediately, or in one or two or three years. So, we assume that he wants a long term of years to repay, say, ten years, and then we stipulate for instalments which will enable him to repay the loan in ten years; we stipulate for this at the beginning.

63796. In your long-term arrangement, what is the average number of years for which you allow loans?—We do not like to have a longer period than ten years. It really is a short term as compared with the operations of land banks.

63797. What is the average period for which you give out loans?—On the whole, not exceeding ten years.

63798. *Sir Thomas Middleton :* Do you do much business in urban centres, or do you aim mainly at agricultural business?—We are aiming mainly at agricultural business. We do deposit business in urban centres, but when I talk about urban centres I am thinking of Rangoon; but there are towns in the delta where we help local industries. We do not bar the acceptance of mortgages on rice mills and house property in towns in the delta.

63799. You, in your own business, have found it convenient, under special and selected conditions, to combine the ordinary operations of the joint stock bank with the work of a land mortgage bank?—Yes.

63800. To what extent is that due to the fact that you are free from what one might call the encumbrances of the commercial banking house, which has to deal with city business?—I think that is due entirely to the extent to which we are free of that kind of business.

63801. I had in mind the remark of the gentleman who commented on "liquid assets" when mortgaged land was under water. You escape that attitude of mind in your business?—Yes.

63802. *Mr. Calvert :* When you are carrying on business which is usually considered impossible, is it fair to ask you to reveal the secret of your success? How do you manage to make these people repay their loans?—We rely very much on character. We think that every customer who wants to borrow money should have a sound character, and that, I think,

is probably one of the reasons. I should like to add that successful banking is successful lending and that we take a great deal of trouble in granting loans.

63803. And you also rely upon your own personal knowledge of the people?—No. We rely on our ability to use the local knowledge of other people.

63804. *Sir Thomas Middleton:* Is that a Scottish banking principle? Have you been following Scottish banking principles?—I think we are.

63805. *The Chairman:* Do you think there is any disadvantage in one and the same concern providing nine months' loans and long-term money as well?—I do not think so. On the whole, only fifteen per cent of our deposits are a demand liability, and eighty-five per cent are on long-term deposits varying from three to five years. Although our demand liability is small, we provide liquid assets up to the standard of banks at Home whose demand liability is in converse ratio, probably eighty-five per cent, and whose time liability is fifteen per cent.

63806. Have you yourself found that the practice of providing long-term money has a tendency to make the loan a little confused?—Yes; one has to watch them.

63807. There might be a tendency, as a result of that practice, for borrowers to be less punctual in the repayment of their instalments?—Yes, we are careful to point out what loans must be liquidated at the end of the year and what not. That has to be carefully watched.

(The witness withdrew.)

The Commission then adjourned till 10 *a.m. on Tuesday, the* 8*th November*, 1927.

Tuesday, November 8th, 1927.

RANGOON.

PRESENT:

The MARQUESS OF LINLITHGOW, D.L. (*Chairman*).

Sir THOMAS MIDDLETON, K.B.E., C.B.
Mr. H. CALVERT, C.I.E., I.C.S.
Raja Sri KRISHNA CHANDRA GAJAPATI NARAYANA DEO of Parlakimedi.
Professor N. GANGULEE.
Dr. L. K. HYDER.
Mr. B. S. KAMAT.
Mr. H. O. REYNOLDS, I.C.S.
U BA CHO.
(*Co-opted Members.*)
Mr. J. A. MADAN, I.C.S.
Mr. F. W. H. SMITH.
(*Joint Secretaries.*)

Professor H. STANLEY JEVONS, M.A., B.Sc., F.S.S., F.G.S., Professor of Economics, University of Rangoon.

Note of Evidence.

Public Health of Rural Population.—As I understand that the welfare of the rural population as a whole is under consideration, I wish to draw special attention to the immense economic waste which preventible diseases cause in Burma. Far too many men die in the prime of life, and leave their families in dire poverty, a burden on their relatives or neighbours. There is some evidence (in the work of the research student of my department, Mr. S. Sundaresan, on the Vital Statistics of Burma) that plague and cholera are partly occupational diseases, the former affecting workers in and about rice-mills and grain godowns and shops, the latter being characteristic of harvest labour, doubtless because harvesting is a thirsty operation, and men are tempted to drink from the nearest water, however filthy.

The seriousness of the loss to the country by the early deaths of workers is not generally recognised. In this connection I may perhaps refer the Commission to a lecture which I prepared in connection with the Health Week in Rangoon of January last on "Economic Aspects of Public Health."* In order to illustrate the economic loss I made a calculation of what its amount would be on the basis of certain reasonable assumptions. I assumed that it would be possible to reduce the death-rate by seven per thousand, *i.e.*, to eighteen or nineteen per thousand, a high rate now for Europe. Assuming certain figures also as the capitalized value to the country of the potential future work of men and women at successive ages, I found that the gross loss to the country by failing to reduce the death-rate worked out at over ten crores of rupees per annum. This figure has no scientific value, for information on which to base a real statistical estimate is not available. I published the figure simply by way of propaganda; and I mention it now only because it does give an indication of the order of magnitude of the loss.

I am convinced, from my visits to several rural areas in Burma, that the Public Health Department has not yet been able to safeguard the health of the rural population in the least, with the exception of preventing smallpox by vaccination, and staying the progress of plague and cholera

* Not printed.

epidemics when they have broken out. Very little has been done towards providing or safeguarding village supplies of drinking water, or to instruct the people in sanitary precautions. I welcome most heartily the proposal now under consideration by Government to appoint a District Health Officer in each district with a trained staff of Assistants and Inspectors. One feature of importance in having a special and fully trained staff for the sole purpose of public health duties lies in the educational effect which it is sure to have; *e.g.*, in teaching the people by local evidence that diseases are preventible if proper measures be taken, and that Government are concerned that these measures should be taken.

Propaganda for Agricultural Improvement.—Propaganda can be direct or indirect: that is, either there is a direct approach to the cultivators themselves to modify their opinions; or the cultivators may be influenced indirectly by creating a general opinion amongst educated persons in favour of improvement of methods of farming, which opinion will gradually filter down to them through the landlord, the school teacher, the subordinate Government servants, and so forth. Direct propaganda must be undertaken by the Agricultural Department. It would consist of posters and leaflets distributed in every village in a district or circle which was to be 'attacked,' the idea being to arouse interest before starting demonstrations on some of the cultivators' own fields. Two or three propaganda lecturers could be specially trained and sent in advance of demonstration officers.

Indirect propaganda seems to me to be of much more importance than is commonly recognised; and here the universities and education departments have a special responsibility. It is important to create an 'atmosphere' of interest in the progress of agriculture and to extend the belief that the rendering of agriculture more productive is the way to increase the wealth and welfare of the people, and to give the country economic strength. Thus, patriotism could be called to aid the diffusing of ideas about better cultivation. The paucity of non-official vernacular literature on agriculture in India is surprising when compared with the literature on agriculture which had been published in England by the middle of the eighteenth century.

I feel that it is the duty of all professors of economics to lay stress on the importance to the country of the improvement of agriculture, and especially to create for the future an atmosphere which will be favourable to the work of the Agricultural Department. For this reason the courses of study in the University of Rangoon include rural and agricultural economics in both the Intermediate and B.A. stages. In the lectures in University College the principles of the improvement of agriculture are dealt with. Intermediate students are expected to read Clouston's Reader of Indian Agriculture, MacKenna's Agriculture in India, and Clayton's Rural Development of Burma. The students, many of whom are townbred and know nothing of rural life, are taken out to a village outside the rural-urban zone to give them some idea of paddy cultivation. For my purpose it is very regrettable that there is no station of the Agricultural Department in the immediate vicinity of Rangoon where improved agricultural implements and machines can be seen. It would be good propaganda to have a permanent exhibition of these in Rangoon as near as possible to the Shwe Dagon pagoda. If a permanent exhibition is not possible, at least there should be an agricultural show once a year on the slopes of the pagoda at the time of a great festival. It is a failure in indirect propaganda that nothing whatever is done to arouse the interest of the public in the capital city in the improvement of agriculture. Rangoon is the centre from which the landlords, professional men and merchants and brokers of all Lower Burma derive their ideas.

Meteorological Service.—I wish to draw attention to the utter inadequacy, for many purposes, of the meteorological data available for Burma. There is a large number of stations fairly well distributed over the Province at which rainfall alone is recorded; but no effort has been made to determine whether the rainfall at the station is typical of the district which it is supposed to represent. We know that, besides inaccuracies of observation, there are extraordinary local variations of rainfall. There are only about a dozen Imperial observation stations in Burma, that is, those inspected by the Director-General of Observatories, India; and these are mainly on the coast. The remainder of the former provincial stations have, I believe, discontinued observations other than of rainfall.

There is as yet no real knowledge of the very numerous and varied climates to be found in Burma and the Shan States. There can be no doubt whatever that Burma would benefit greatly by the introduction of new species and varieties of vegetables and fruits, not to say crops, which is less generally recognised. There are two ways of proceeding with the introduction of new plants of economic value: (1) by trial and error with a large number of species obtained more or less at randoom from other tropical and sub-tropical countries, the percentage of failure being necessarily very large; or (2) by finding out the habitat of plants proposed to be introduced, as to climate, soil, pests, etc., and searching for similar conditions of climate and soil in Burma, with access to market. The search for plants to suit climates, or climates to suit plants, both imply ample and reliable meteorological data.

Having in view the growing importance of commercial air traffic and the possibilities of improvement of forecasts of weather for sea-going ships, the need of accurate meteorological data for study in connection with vital statistics, and the possible forecasting of epidemics therefrom, besides the agricultural purpose mentioned, it would seem highly desirable that the Government of Burma should establish its own meterological service on a basis of efficiency under an expert whole-time officer. The example of Bengal is worth studying. It would seem desirable, in any case, that the Agricultural Department should undertake at its experimental farms daily observations of pressure, temperature, humidity and sunshine.

Expansion of the Agricultural Department's Activities.—Writing as an independent observer, I should say that the Agricultural Department in Burma has done remarkably good work considering the short time it has been in existence and the smallness of the staff until quite recently. Even now the staff in my opinion, as an economist, is utterly inadequate for the work that needs doing. I should expect the Province to benefit very greatly after fifteen or twenty years of work on an enlarged scale with a staff five times as large as the present staff. A much larger number of expert European officers is needed in all branches, and a large number of Burman officers should be trained as rapidly as possible for the experimental, demonstration and seed distribution services.

The Agricultural Department should have the following branches, with three or four European officers in each (until Burmans with equal training and ability are available):—

Administration and organisation.
Research (scientific and technical, in an institute separate from the colleges, though near one).
Experimental farms.
Agricultural engineering (civil and mechanical).
Demonstration and seed distribution.
Economic and statistical research and information.
Propaganda by literature, lectures and travelling shows.
Agricultural colleges (Mandalay and Rangoon).

I wish particularly to stress the need of developing agricultural engineering. Burmans take readily to the use of machines, witness the rapid growth of the taxi and motor bus business wherever there are roads, and the number of small towns, having electric light plants. The Ford Motor Company has sold many Fordson tractors for paddy cultivation, the ploughing being done before the rains.

Oral Evidence.

63808. *The Chairman:* Professor Jevons, you are of the University of Rangoon?—Yes.

63809. What Chair is it that you hold?—The Chair of Economics.

63810. You attach great importance, from the economic angle, to the incidence of preventible disease?—Yes, I do; that is a matter in which I have interested myself particularly in the last two years.

63811. You form the view that the provision of a supply of pure drinking water would make a very material contribution towards the solution of the public health problem?—Yes. I think so.

63812. Is it your view that, from the economic side, the cost of providing such potable water for the use of the population ought to repay itself many-fold?—Yes.

63813. How far have you examined the question of the cost of providing good drinking water?—It is almost impossible to give any estimate per head of the population. There are about seven or eight different ways in which good drinking water might be provided, according to the character of the locality.

63814. It is to be remembered that, as well as first cost, there would be a considerable maintenance charge and probably a substantial annual expenditure on administration if the water-supply was to be kept pure?—Yes, I have borne that in mind. One village of 2,000 inhabitants would not need to employ more than one man continuously, I think.

63815. Apart from the health and amenities of the population, you think that the bargain, in terms of rupees, would be a good one?—Yes, I do.

63816. You make a strong plea for what you call indirect propaganda with a view to raising, in the public mind, an interest in agricultural progress?—Yes.

63817. Do you think that anything is being done in that way at the moment?—If I may say so, I think the fact of this Royal Commission being here is one of the greatest assets at the present time in that way. It has given a prestige to the whole question of improvement of agriculture which is very important.

63818. But apart from that, do you think you have seen, during the past few years, any general movement of public opinion in that direction? —There has been a change within the last five years partly owing to the work of the Agricultural Department, partly owing to the missionary agencies like Mr. Higginbottom in Allahabad and the Y.M.C.A. having taken up rural work; and again, the extraordinary success of the late Sir Ganga Ram in his farm operations in the Punjab has undoubtedly stirred public opinion. But it is small compared to what it ought to be.

63819. The notion of agriculture as something which can be materially bettered by the application of science and experiment is something quite new to India, is it not?—Yes, that is so. For very many years the Agricultural departments could hardly justify themselves by pointing to any solid work done; but that condition, I think, is changing now.

63820. Do you think that the discussions in the Legislatures in India have tended to excite public interest in agriculture whenever there have been discussions about agriculture?—Not very much, I should say; in fact it was some discussions which took place in the Bihar Legislature which made me very convinced that more propaganda was necessary.

63821. On page 266 of your note, you are talking about the future of the Meteorological Service in relation to Burma and you say the example of Bengal is worth studying. I am not quite certain as to what you meant there?—I mean that Bengal had organised a Meteorological Service and it has many more stations than we have in Burma.

63822. *Professor Gangulee:* Where is the chief station in Bengal?—I think, Calcutta.

63823. Are you referring to Alipore Meteorological Station? That is under the Government of India?—I was under the impression that there was a provincial officer there.

63824. *The Chairman:* I do not think so. You give us, at one point a statement about the number of tractors that have been purchased in Burma?—Yes, I obtained a list from the Ford Motors, Limited.

63825. Could you tell us how many of those are being used for purely agricultural purposes?—I could not say definitely, but I should think about fifteen, excluding the rubber estates.

63826. You have interested yourself in the problems of consolidating fragmented holdings. Have you been watching the movement in the Punjab?—I have read descriptions of the work initiated by Mr. Calvert which I think very highly of indeed.

63827. Would you agree that the results achieved are very remarkable? —Yes; the idea of the method was extraordinarily good.

63828. Do you think that achieving the end by persuading the cultivator to come into the scheme is probably, in the long run, better than any attempt at compulsion, or would you at this stage exercise compulsion?—I have always felt, and still feel, that compulsion will be necessary if the movement is to go far. Considering the amount of work that has been entailed in the Punjab, persuading people to undertake it could not be applied wholesale. I think that, where the people have been educated sufficiently for a majority of owners to desire consolidation, or where there is a majority of cultivators who cannot persuade owners, then the minority who are obstructing progress should be made to come in. Such obstruction is very often pure pig-headedness. I should like to explain that I do not mean that an initiative should be taken in compulsion by the Government, but rather that when an application is made by holders of a majority of the areas there should be powers existing by which compulsion could be applied to the minority.

63829. Do you regard the spread of literacy as an important preliminary to any general rise in the standard of living and towards the desire to live better?—It is desirable that it should go along with it, but it is not a necessary preliminary. I do not think, however, that the standard of living can be very much raised without an increase of literacy.

63830. What do you regard as the first essential for raising the standard of living?—That is a complicated question. It requires, in my mind, a combination of circumstances, a combination of reforms. You must make agriculture more productive, but if you make it more productive only very slowly and if there is nothing to lower the birth-rate, then the increased produce of the soil will be eaten up by the increased population.

63831. You do not place much faith in biological control which is supposed to follow a higher standard of education and of living?—Yes, I do, when the standard of living has already been raised to a certain level.

63832. You have got to raise the ground level before you proceed to go up?—Yes.

63833. Do these considerations apply with equal force to Burma and to India?—I think so.

63834. Is there any pressure of the population on the land in Burma?—There is beginning to be a decided pressure on the land, though nothing comparable to what exists in many parts of India. Looking up, yesterday, something that I had written a year or two ago, I saw that I said there that you might date the period at which all available and readily accessible land was taken up in Burma at between fifteen and twenty years ago. From about fifteen years ago, we have begun to have the pressure of population acting even in Lower Burma; and the emergence of the growth of a landlord class is the first evidence of that.

63835. Do you not think that communications and rapid and more convenient means of transport are an important agency in creating a desire for better living?—Yes; I think they are very important indeed.

63836. Good communications tend to break up the group system; the inhabitants of one village see the conditions in other villages?—Undoubtedly; it starts a complete change in the type of civilisation. It does not follow that it is always of immediate benefit to the population who are not familiar with the ways of traders who come from distant countries.

63837. Are we not coming back to primary education?—Yes. Might I just stress one point in this connection, and that is the great importance I attach to the correlation of measures of reform, progress and economic development, and of concentration. The tendency of the population to grow, so that it overtakes or keeps pace with the increased productivity of the soil, can only be surmounted, in my opinion, by combining a number of different measures of development at one time in the same area. That is to say, if you provide irrigation canals or other irrigation facilities in a territory, then there should be roads and additional railway facilities in the same area, the Agricultural Department should become especially active, also the Co-operative Department and the Education Department; and if all these forces are concentrated at one time in a locality then there is a great opportunity of raising the standard of living sufficiently rapidly to prevent the growth of population eating up the advantages which the population might be reaping.

63838. It means a large sum of money, does it not?—Yes; it does; but I have seriously come to the conclusion that it would be better to proceed piecemeal in a geographical sense rather than to endeavour to uplift the whole country.

63839. But piecemeal progress is being made in certain parts of the country, is it not?—Yes; but as a matter of fact, it is accidental. It has been done in parts of India, where you have the canal colonies in the Punjab, and certain colonies in other parts. Particular attention has been given to developing those areas and they are going ahead very remarkably; the standard of living is being raised there.

63840. Do you not think that development in all countries is uneven and piecemeal?—I think it has been uneven and piecemeal in the past through a total want of any conception of the necessity of co-ordinating measures of development. The Agricultural Department suddenly makes up its mind that it wants to improve the cotton crop in a certain area; nothing else is done by any other department while it is concentrating there. The Irrigation Department develops new canals in quite other places; and the Railway Department builds branch lines in quite a different area.

63841. Probably the same thing will happen as happened in manufactures?—Yes. Of course, with reference to that, I may add that there was the *laissez faire* idea at the time in England; no attention was paid to general questions of development.

63842. You really think that a deliberate policy should be laid down?—I think so; we require, in each Province, a Board of Economic Development, not a large board, but a small board, of expert persons who would attempt the correlation. Anything in that direction would be better than nothing.

63843. *Sir Thomas Middleton:* You point out how necessary it is to test the work being done by the rainfall observation stations in Burma?—Yes.

63844. You have a moderate number of stations, but you point out that there is no means whatever of testing whether these stations indicate the average rainfall for the districts in which they are located?—That is my opinion.

63845. Should this testing be done by the Imperial Department, or is it work which ought to be done by the Provinces?—What I feel is, if the Indian Meteorological Service will not do it, then it is so important that the Provincial Government should do it. As far as I understand the situation (I do not profess to be an expert in meteorology, I have just been forced to look into it a little), it is this: the Meteorological Department found that the observations which were being done at a large number of stations in Burma were hopelessly inaccurate and it was decided that all stations which provide data for the department must be carefully supervised from time to time; therefore, they limited the number of stations. Work is being carried out at a limited number of stations, and the rest have been allowed to go into disuse.

63846. You think it necessary that those stations which are under the Meteorological Department should be carefully supervised?—Yes.

63847. It would be quite impossible for the Indian Meteorological Department to establish a large number of sub-stations throughout India to obtain the verification, which you desire, of the figures at the main station. Is it not the business of the Provinces to set up these sub-stations which you are now asking for?—I have suggested that if it was not done by the Imperial Department it should be done by the Provinces. I have, however, some idea that postmasters might be used in certain cases. I do not see why postmasters should not be given three months' training and asked to take observations. They are accustomed to responsible work to be done punctually at stated hours, and that is the main thing.

63848. Do you know how our rainfall statistics are collected in England?—I imagine, through a great number of agencies.

63849. The position is that there are only a small number of official stations, but there are a great number of non-official stations?—Yes; there are a great number of non-official stations.

63850. If you cannot get non-official observers in the Indian Provinces it must be the local administration that must step into the breach; you cannot expect the Imperial Governmnet to do it?—Yes.

63851. You express surprise that there is a paucity of literature on agriculture in India?—Yes, in the vernacular.

63852. You have a very small number of literates among Indian agriculturists, and a very small demand for reading matter?—The landowning class in India and Burma is very largely literate. You see, for a long time, the educated landowning classes in England were taking no interest in agriculture, whilst the farming classes were quite illiterate; but towards the end of the seventeenth century books began to be written on improved implements and methods of agriculture; and by the middle of the eighteenth century there was a considerable literature on agriculture in England, which appealed to and aroused the interest of the landlord class, and many landlords had their own farms.

The educated middle classes in England had very little to read in the early eighteenth century to which you refer; the educated Indian of to-day has got newspapers, he has not got to depend on the pamphlet writer.

63853. *Mr. Calvert:* On this question of development, where a State is expending money which brings in a direct return, there is no difference of opinion; but what policy do you think should be adopted by a State in raising funds for development which may not bring in a return?—Well, I think it should regard the indirect return which may be obtained from the taxation of the increased wealth of the given area as quite equal, from the point of view of the State, to the direct return from irrigation or railways. Therefore, I think that expenditure in excess of what might be considered to be good finance for the purpose of the budget is thoroughly warranted when that expenditure is being devoted to measures of development which, assuming they are seriously planned, will bring in a handsome economic return within ten or twenty years. So, I would say either an additional tax, or in certain cases even loans, might be raised.

63854. You have raised the question of loans. For intensive development in one district you are going to impose a tax on the posterity of Burma in the hope that posterity will be able to bear it. Your argument is, borrow two crores for intensive agricultural research, but no one knows that it is going to yield the result that you anticipate?—The figure you mentioned, I should consider as an unwarranted gamble in research. But a State must take a certain amount of risk for the future benefit of the country. I would say it would be justifiable to borrow two crores of rupees for acquiring experimental stations, demonstration stations and seed supply farms, for putting up the necessary buildings and for meeting all the incidental expenses, besides research. A certain amount might be spent, out of that loan money, on research.

63855. Would you confine the expenditure from loan money to capital expenditure?—Where a definite co-ordinated policy had been decided on, then some of the cost of research, a little of what is ordinarily called recurring expenditure, might be debited to loan money, because it would not be difficult to recover it provided the scheme has been properly conceived.

63856. We have received evidence to the effect that people in Burma take rather an uneconomic view of life; is that your experience?—Yes; I think so.

63857. Comparing the people you have met here with the people round Allahabad, would you say that there is a more serious view of life in India?—Yes; somewhat. I would attribute it to the fact that in Burma the tradition of making a livelihood very easily from agriculture still persists. It has not been necessary to be anything but an agriculturist in previous generations. You sowed your paddy, you transplanted it, and you got a crop; there was plenty of land available. An Indian in the crowded areas has been obliged, for generations, to consider and calculate very carefully, in order to make both ends meet. There is that difference.

63858. Given a population where the desire to accumulate wealth is not a powerful incentive to industry, do you not think that it would be disastrous to raise a loan for purposes of development?—If you are having

Burma in mind, I would like to point out that, although the money incentive does not appear to operate with the ordinary cultivator at the present time, directly that cultivator is educated it does begin to operate. We see the Burmese people rapidly getting rich in many parts, directly they understand business methods, and one of the most important ways, if I might so put it, for teaching business methods would be the improvement of the teaching of arithmetic in the schools, which is extremely badly taught at present in this Province.

63859. *Dr. Hyder:* Mr. Calvert's conclusion would be true on the assumption that the character of the Burman would remain a fixed quantity and never change?—That would be so.

63860. *Mr. Calvert:* Do you find that your Burman students accept the broad economic generalisations as based on actual observation, or do they simply take text-book maxims and learn them by heart?—They probably take them because I say them; both because they are in the book, and because the teacher says so. The general tendency of all students is to accept statements so given.

63861. *The Chairman:* Do you think it really is so?—I think so, in the earlier stages; but I have to proceed later on to make them critical and unwilling to accept the statements without testing them themselves.

63862. *Mr. Calvert:* Could they see the fallacy in the view, which we hear repeatedly expressed, that India should be self-contained in all her requirements, and at the same time have a mercantile marine?—I think that, after they have had college teaching for a couple of years, they would certainly see the fallacy. You must remember that they come to me in the intermediate stage, in what practically should be the last class of the high school, with very indifferent knowledge of English and very poor knowledge of arithmetic, and the first thing that we have to do is to give them some information and coach them in commercial arithmetic, the elements of business, and so on. Purely descriptive work is done in the first year.

63863. *Dr. Hyder:* You have been for some time in India?—Yes. I was for nearly nine years at Allahabad.

63864. And you have been here for three or four years?—For over four years.

63865. Have you given any thought to the co-operative movement in Burma?—I have naturally thought a good deal about it. I have questioned officers of Government, and I have come to certain conclusions. They are not based on personal observation, but on general reasoning.

63866. The co-operative movement has not developed in Burma. What are the causes for that?—In my opinion, it is because of the persistent treating of the cultivator as if he were not a man with ordinary desires. When you form a limited company, the shareholders come in with the expectation of ultimately getting some dividend. When the Co-operative Department started out forming co-operative societies and prevented the shareholders who were expecting to get some dividend from getting it, and furthermore neglected to take into account the very important principle that they should be co-operative savings societies as well as lending societies, it seemed to me that the movement was bound to fail, excepting if it had official pressure behind it, or an unlimited supply of funds to lend out. The original conception of co-operative societies, as I have always understood it, was that they should be real co-operative savings societies, that the cultivators who have a little money to invest for the time being should put it into their own local society, and that when they wanted to borrow they should borrow from the local society the savings of their friends in the village. That is an intelligible principle which will naturally work, and it is, in my opinion, necessary that the societies in Burma should accept savings deposited by the villagers and, moreover, that the rules should be altered so that they should be allowed to pay out dividends after the reserve has reached a certain proportion of the capital of the society. In that case, I believe the villagers will begin to take a real interest in the societies and to work for their improvement, instead of feeling that the whole system is managed from outside and that they are dependent upon the district bank and the union control.

63867. You are aware of the fact that roads do form a very important part in the economic development of Burma? Have you any comments to make in this connection?—I am very glad to note that the development

of roads is being pushed forward. My own view as to the alignment of roads has been that, of the money which was available, it would have been better perhaps to expend a much larger proportion upon making feeder roads to railways than upon making trunk roads. That is a very controversial question on which something can be said on both sides, and I notice that different policies have been followed in different parts of India in regard to this.

63868. One advantage of feeder roads, I think, in your opinion, would be that they would help to open out the inland districts?—Exactly. I think anybody who has been about the rural districts of Burma soon after the paddy harvest, when the paddy is ready to go to the station, and has seen the struggles which they have in getting the carts on to a road at long distances from the paddy fields, and the light weights which all the carts are able to carry, must see that it is absolutely essential that a network of village roads should be developed. No part of Burma can develop rightly until we have a regular system of roads, a regular network of village roads, and most of them require to be metalled in this scheme, because there is the very long and heavy monsoon.

63869. You have been following the discussions in the legislatures in different Provinces of India?—To some extent; what is published in the newspapers I read.

63870. What is it that they discuss in these Provincial legislatures?—Education a good deal.

63871. Do they ever discuss the co-operative movement?—Excepting Bombay, I cannot remember ever seeing much reference to it.

63872. Do they give any thought to veterinary matters?—I do not think so.

63873. They do not talk about milk yields and grazing lands?—The question of grazing lands is often raised, because the Forest Department is said to be invading the rights of the villagers.

63874. Do they talk about rent and revenue matters?—Yes.

63875. Say, in the United Provinces?—Yes; the main question of course being the permanent fixation of the land revenue.

63876. Do they talk about floods and bring resolutions urging action on the part of Government?—Yes.

63877. Do they give any attention to crops?—Not a great amount, but a certain amount. I have seen a little of it.

63878. I was wondering whether you had given any attention to one aspect of the matter, which is very important from the economic point of view, namely, the Buddhist view of life on the economic progress of the country?—I do not profess to be able to speak on it with the authority of one who has lived a long period in the country and knows the language. My impression is that it has induced a somewhat fatalistic attitude.

63879. Do you see signs of any change in this outlook?—I see distinct signs of change, and I see very hopeful signs in the interest which people are beginning to take in local government. I was very much interested to hear, when I happened to be in Pyapon, that the evening before I arrived a public meeting had been held to consider what roads the Public Works Department should be requested to estimate for in their district. That seemed to me to show a little more initiative than I had been accustomed to in India.

63880. The materialistic view of life in the West is also very recent, going back about two hundred years. I ask you to consider the bearing of the Calvinistic movement, the Huguenot outlook and other movements in Europe, and correlate them with the teaching of the Bible and other matters?—I think it goes back a little further than that; you might say to the sixteenth century. There was an awakening of interest in business matters then, though it had not affected agriculture.

63881. As regards the question of increase in productivity and rise in the standard of living and growth of numbers, it has been pointed out to us in India that it is no use making canals, constructing railways, and increasing the yields of crops, because all this will be balanced by an increase in population. I ask you, what has been the result in the past? Take England or the Netherlands: When there was an increase

in the national income, say, about a hundred years ago, was there an increase in the population of England?—That happened at the beginning of the nineteenth century and that coincided with the development of industries and the application of power to all industries.

63882. What we are asked to do is that we should jump over the experience of a hundred years by restriction of numbers? That will come about by itself?—I think it will only come about if we have a policy of development of industries in the cities at the same time as the development of rural areas. That is what people overlook. You see, the two were going on concurrently in England. There was the development of transport and of canals. This was very important. There were large mining operations growing up in the coal fields. There was pottery manufacture and others besides the textiles. At the same time a great deal of attention was being given to developing capitalistic agriculture; and the two are necessarily reciprocal. One cannot go far without the other. The cities need the buying power of the country; and of course the producers in the country need the buying power of the cities.

63883. I am on a different point. My point is that when there was an increase in the command over material resources in the western capitalistic countries there was also, going on, a corresponding increase in population and after some time opinion changed?—Of course, in the early days of development, the tendency was for the population to overtake the growth of the additional command over economic resources. How far that was due to the Napoleonic wars or other causes it is very difficult to say; it is difficult to disentangle the causes.

63884. Have you anything to suggest for improving agricultural statistics?—I am afraid that is a subject on which I can give no assistance at all. I do not say that I am by any means satisfied with the present statistics. It is a very expert matter and I would simply leave it to the Agricultural Department who know a great deal more about it.

63885. *Professor Gangulee :* Would you express an opinion on the agricultural statistics that are now available from the Government of India? Are they reliable? Do you find them useful? Have you any suggestions to make?—No. I have made no special study of the question of agricultural statistics. I have accepted the criticisms that have been made, as they appeared to me to be very reasonable. It is a branch of activity which needs a great deal of attention, in which you can get perfection only by continuous perseverance.

63886. You agree that reliable statistics are very important for economic studies?—It is important for business people, as well for the economist and the statesman, that we should have reliable statistics.

63887. In the Rangoon University I understand you have a course of study which includes rural and agricultural economics, both in the Intermediate and in the B.A.?—Yes.

63888. Are these compulsory or optional?—Compulsory. It is the ordinary course which all the students take.

63889. When was it introduced?—In 1924. There was nobody here in the Chair before myself.

63890. Do you find that the students take an interest in rural economics? —Yes, but I am surprised to find how very little they know about the subject, even those whose homes are in rural towns, small towns like Prome for instance. They never seem to go out into the villages. They remain in the small town all their lives.

63891. In teaching rural economics, do you depend on any text-book?— Yes. I have mentioned three books.

63892. Those are of a very elementary nature?—In the lectures we supplement them very considerably. I do not in the least adhere to the book.

63893. Do you collect agricultural data relating to rural economics in order to explain a certain position that you want to explain?—I am afraid that has proved beyond our capacity. I have now and then collected some data as the result of an excursion I have made, and I have always arranged to take the students out into the country.

63894. I find that our students are taught economics which are quite unrelated to the realities of life. They know absolutely nothing about the facts of rural life and their knowledge is confined to the text-books?—

That is the trouble. That is why I take them out into the country, whenever I can. This is very important as it affords a good foundation, but it is not much.

63895. Have the students whom you have turned out from the University of Rangoon with an adequate knowledge, I take it, of rural economics, initiated any inquiry themselves?—No. You must remember that they are all Intermediate students whom we have turned out. The first students who will have been right through the course will be taking their degree examination next March.

63896. Are you familiar with the Board of Economic Inquiry in the Punjab?—I know some of its publications.

63897. Do you think that a step in that direction could profitably be taken by the Rangoon University?—I think that if the Government were desirous of forming such a Board, the University staff would be willing to co-operate. It is only in the present session that we have had what we may call an adequate staff for economics in the University. Now I have two lecturers and a third temporary lecturer.

63898. You regret very much that there is no agricultural station in the immediate vicinity of Rangoon. Is there not an agricultural station within a radius of twenty or twenty-five miles?—There are two, I think, but they are not easily accessible. The Hmawbi farm is beyond our reach. What we should like to see is a station within six or eight miles of Rangoon on the railway line, as having to go by water is always a very slow process. In that case we could take students out at least four or five times during the session. We could take them out every month to see the progress of things. We can only visit Hmawbi once a year. That does not give you an idea of what is going on.

63899. You attach a great deal of importance to agricultural engineering?—Yes, I do.

63900. What aspect of agricultural engineering would you like to emphasize?—Implements, drainage, irrigation by pumping, such questions as the threshing of the paddy and proper storage, and bringing it into market—all these things, I think, are really better tackled by engineers. When I speak of implements, I am thinking of both animal-drawn and power ploughs. I think it is very necessary to pursue development in both directions. I think there is a great field for power-driven machinery in Lower Burma. I understand that in French Cochin China there has been a very considerable development of the use of tractors for paddy cultivation.

63901. Have you ever tried to work out the economics of the employment of farm machinery under the existing conditions?—No. I have not. I can give you some theoretical suggestions on the subject but I have not gone into the question of costs. I did try to get the costs of ploughing by their tractors in Burma from Ford Motors, Limited. They said they did not experiment with them themselves. They made demonstrations to the landowners and large cultivators and usually that was sufficient to sell the machine without going into the question of costs. I should like to make this point in connection with the growing use of the tractor: It is a labour-saving appliance and the tendency therefore will be to reduce the demand for labour in the rural areas. It must have that ultimate tendency, as has been the case in all Western countries. But of course the use of tractors cannot go far solely for ploughing. You must have a whole series of machines to do all the operations required. If you want to get rid of animals in one stage it is not economical unless you can get rid of them in all stages.

63902. You suggest an expansion of the activities of the Agricultural Department and you desire to have a large number of European experts in all branches; you also suggest that Burman officers should be trained for demonstration and other work. Do you find, among the students, a sincere desire to take to agricultural studies?—There is no desire at all; or at least it is very small. It is one of the internal difficulties of our University that students who come to me are entirely arts students. Those who have had any leaning towards technical and practical things take science courses and I have nothing to do with them, so that I have had to look at this teaching solely from the propaganda point of view, to create an interest among the future educated classes of Burma in the progress of agriculture. We are still only in the beginning stage. It is only about two or three years ago that we started this work.

63903. In the additional note that you submitted to us, you suggest the formation of an Imperial Agricultural Association. Have you thought out the details of that?—I am glad you have raised that point, because I do think that this would be an important means of general propaganda and of giving a prestige to discussions on agricultural matters. I did, as a matter of fact, draw up a rough outline of a scheme for an Imperial Agricultural Association early in 1925 and I circulated it to a number of friends. It was dropped simply because of the appointment of this Commission. I have got a copy of the scheme here. (*Document handed in.**) My idea of the Association was that it should be semi-official, in the sense that the Red Cross Society is, in India, and that it should receive some grant from the Government, although the actual working in the Provinces would be voluntary.

63904. Then, why do you call it Imperial? Why not aim at provincial agricultural associations?—Because, just as the Red Cross is organised from the centre, here too, it would be better if the stimulus came from the centre. The people in the Government of India could stir up the Provinces.

63905. Are you familiar with the Board of Agriculture's activities in India?—Certainly; I attended one of the conferences some years ago.

63906. In what way would this Imperial Agricultural Association differ from the Board of Agriculture?—It would differ very much from the Board of Agriculture. This would be a propagandist association mainly. The Board of Agriculture should become more and more a meeting of experts; in fact, it is already a meeting of experts.

63907. We are told that adult education in the rural areas is very much needed in this Province. Do you find any signs, amongst your students in the University, of initiative in that direction?—I have not the slightest idea of that.

63908. Do you think that the export cess on rice affects the producer in any way?—I should say that the larger part of the incidence of the tax is on the producer; not the whole necessarily, but the larger part of it. Still, it is not a very heavy tax.

63909. So you think it affects the producer?—He does get a slightly lower price on the average, I should say, for his produce. In general I subscribe to the principle that an export tax should only be placed on agricultural produce for the purpose of providing funds to promote that particular branch of industry.

63910. *Mr. Kamat:* To take up this last point with regard to the export cess on rice: although a large part of it may fall, so far as incidence is concerned, on the producer, is it, in actual practice at the present moment, discouraging the cultivation of rice to a material extent?—It is not discouraging it, except that there might be a few thousand acres more cultivated if there were no export duty. That is the extent of the discouragement.

63911. Theoretically, yes; but in actual practice is it really substantial?—I should say, it is impossible to obtain the data to see what is happening in actual practice.

63912. You spoke, a few minutes ago, about industrial development. Side by side with agricultural development do you think that industrial development is being sufficiently assisted by Government?—Under modern conditions I think it is: I have no special recommendation to make in that direction excepting development of agencies for technical education, which is very important.

63913. In that direction you do think that something more could be done?—Yes, I think so, in all the Provinces of India, and particularly in Burma.

63914. If that is so, are there sufficient scholarships, or such like aids on the part of Government, to send students abroad for their technical courses?—Yes, I think so; it is only a very exceptional student who can benefit by these foreign scholarships, I think. The tendency, at any rate in Burma, has been that we have not had a sufficient number of students who have really been of the requisite standard as to qualities both of intellect and character to be of use to the country afterwards in that way. I would like to see more money spent on technical education within the country, rather than on additional scholarships for going to foreign countries.

* Vide Appendix on page 277.

63915. At present, the proportion of people living on agriculture is said to be somewhere about seventy per cent of the population. In your opinion, would it be desirable to divert some portion of this into manufacturing concerns?—Yes, I think so, provided the authorities will keep the towns in a more sanitary condition, otherwise the population who migrate to the towns simply die off when the town is so insanitary, as, for example, Bombay and Rangoon are.

63916. Subject to the condition that the amenities of town life are kept up to the mark, on economic grounds would you object to a certain proportion leaving the land and taking to a manufacturing occupation?—No; I should welcome it. I think that the standard of living, among the cultivators, is very largely determined by the standard of living of workers in the cities, particularly the industrial workers. That is always so in the West, and it is becoming evident that it is so in India as well. The more we can increase the welfare, the real wages of the industrial workers in the cities, the more does that operate to raise the standard of living in the rural areas, because the people are attracted away. Labour is not so abundant and, moreover, those who migrate from the villages to the towns and come back again have learned a new way of life. I wish I could say it was a better way, but it ought to be a better way. But they do tend to set a higher standard of living.

63917. We are often told that, temperamentally, the Burman and the Indian have not the desire to improve their standard of living?—That is not true of the Burman. My observation is that the Burman has not only every desire to maintain his standard of living but that directly he becomes educated he wants to improve it.

63918. What is your observation about the Indians?—I think the very poor Indians in the congested districts have had all the ambition, if they ever had any, crushed out of them. For myself, I think that the poorest Indian has no ambition at present.

63919. Is that because the Indian has not the opportunities of seeing around him other people who live up to a decent standard of life and he himself does not know how to spend his money, even though he may have improved his purchasing power?—Yes, very largely so; at the same time, also, the feeling is still very largely prevalent in India amongst the cultivating classes that if they do make an effort to live better, display a little bit of ostentation in better clothes, more brass vessels and so forth, that would simply be taken as proof that they had more resources, and somebody, either the moneylender or the landlord or the tax-collector, would take that money.

63920. Have you observed in India that men of the middle classes going to England and seeing how the middle classes in England live (their houses, their clothes, furniture and surroundings), come back to India and make an attempt to live in the same style?—Yes, I think they do tend, on the whole, to aim at a higher standard.

63921. In the case of the poorer classes, if they had had the same opportunities to see things for themselves in towns, would not the desire to live better be created in them as well?—Yes. Of course that knowledge is being given by improving communications. The two great agents for raising the standard of living are education and travel, and directly people are able to go by motor bus from their town to the nearest railway town and then travel by train to Benares or anywhere else, they see things for themselves and their outlook is greatly widened.

63922. It comes to this, therefore, that there is a desire for a higher standard of living, but there is not the knowledge and understanding of how to live better?—I do not altogether agree with you there. I think the desire is aroused by the fact of travel. They will start going, out of pure curiosity, to other places; then they begin to get interested in the ways of the people they see in those other places, and this begins to open their eyes to the fact that they could live in a different way.

63923. *U Ba Cho:* With regard to the cess on exports from Burma, you think the amount realised on that should be spent for the improvement of that particular commodity?—Yes, I should certainly like to see the whole of the export cess on rice from Burma applied to the improvement of agriculture in Burma.

63924. Do you know that the export cess on rice and oils has been taken away by the Government of India?—Yes; I know that it has been appropriated to Central Revenues.

63925. And that Burma has no share of it directly?—Yes.

63926. In connection with that a great deal of discussion has taken place both inside and outside the legislature for the last three or four years?—Yes.

63927. *The Chairman:* Do you favour special taxes for particular purposes or do you believe, in the main, that sound policy lies in depending on your general revenues?—I think that, in the earlier stages of the development of a country, special taxes for particular purposes are very useful. You then have a definitely assigned amount; and it is possible to estimate, with a certain degree of accuracy, what the proceeds will be, and a definite programme of expenditure for a number of years can thus be outlined. Furthermore, I think it has some benefit in rousing the interest of the people in that particular subject.

63928. It makes a certain appeal to the imagination?—Yes, that is so.

(The witness withdrew.)

The Commission then adjourned till 2 p.m. on Wednesday, the 9th November 1927, at Mandalay.

APPENDIX.

Proposed Imperial Agricultural Association.

OFFICERS.

Patron: His Excellency the Viceroy (to be approached).

President:

Vice-Presidents: (About twelve persons of prominence who have interested themselves in Indian agriculture.)

Honorary Treasurer:

Honorary Secretary:

Organising Secretary (salaried):

Provincial Honorary Secretaries:

COUNCIL.

Between thirty and thirty-five persons, in addition to all the officers, chosen so as to represent all Provinces.

EXECUTIVE COMMITTEE.

Seven persons, able to meet at Delhi, or elsewhere, like Lucknow or Nagpur, four times yearly.

SPECIAL COMMITTEES.

Special Committees should be appointed for (1) agricultural shows, (2) propaganda literature, (3) co-ordination with other agencies, (4) demonstration work in selected places, and for other purposes.

Objects.—The main object of the association would be to arouse an interest in the improvement of agriculture amongst all classes of the people. The very important principle needs to be recognised that fashions and new ideas generally filter downwards from the intellectual and wealthy classes. What the townspeople talk about is diffused by stages to the landed gentry, to officials of the districts, and ultimately to the cultivators. Hence it is desirable to carry on propaganda in the towns to convince every one of the immense importance of the improvement of agriculture for the welfare and prosperity of India. The association would also help to create a public opinion in favour of larger expenditure on the agricultural departments of

the several Provinces, with a view to a great expansion of their staff and activities. It would in no sense be a rival to the Government organisation; but would supplement it, and make its usefulness better known to the people. At the same time the association would be perfectly independent, and its executive committee would not remain silent if criticism appeared, on inquiry, to be called for.

Methods.—The three principal ways of educating the public on agricultural questions would be (1) by publishing a journal in English and one or more journals in vernacular, and pamphlets and leaflets in the principal languages; (2) by employing popular lecturers on agricultural subjects to tour the country towns, and villages perhaps in certain areas; (3) by organising peripatetic agricultural exhibitions to be combined with shows of local produce and stock, a liberal list of prizes being offered. Another method of propaganda might be tried, which has been used successfully in certain countries, namely, to issue, and post up in the villages, coloured posters designed to impress simple-minded people; the big crop from selected seed shown alongside the picture of the poor crop from ordinary seed; a family fat and prosperous alongside a group of lean and worried parents with starving children, showing the result of following the seven rules of improved cultivation.

The committee of co-ordination would take care that the work was carried on in useful relation with the Agricultural Department, with missionary and other institutions for agricultural education, and with the co-operative movement.

Subscription.—It may be suggested that the minimum annual subscription should be Rs. 10 for which the member would be entitled to receive one of the journals issued by the association, and all its leaflets. It may be suggested that the association might do well to make a bulk subscription to the Agricultural Journal of India, and distribute it to some or all of its members, without any charge beyond the subscription. The association might, however, find it desirable to issue a popular monthly journal devoted to propaganda in favour of improved agriculture, and which might summarise from time to time the results obtained by the agricultural departments of the Provinces, and give all news about progress.

Initiation.—It would be necessary in the first place to find out whether a large body of people would support the idea of forming such an association under high auspices.

Wednesday, November 9th, 1927.

MANDALAY.

PRESENT :

The MARQUESS OF LINLITHGOW, D.L. (*Chairman*).

Sir THOMAS MIDDLETON, K.B.E., C.B.
Sir JAMES MACKENNA, Kt., C.I.E., I.C.S.
Mr. H. CALVERT, C.I.E., I.C.S.
Raja Sri KRISHNA CHANDRA GAJAPATI NARAYANA DEO of Parlakimedi.
Professor N. GANGULEE.
Dr. L. K. HYDER.
Mr. B. S. KAMAT.

U BA CHO. (*Co-opted Member.*)

Mr. J. A. MADAN, I.C.S.
Mr. F. W. H. SMITH. } (*Joint Secretaries.*)

Mr. J. CHARLTON, M.Sc., F.I.C., I.A.S., Principal, Agricultural College, Mandalay.

Replies to the Questionnaire.

QUESTION 1.—RESEARCH.—(*a*) The fact that the Agricultural Chemist, Burma, is responsible for teaching and research and routine work effectually prevents his leaving Mandalay and so becoming really conversant with agricultural problems in various parts of the Province. From mid-June to the end of March he is occupied in delivering lectures on agricultural chemistry, which none of his staff is as yet capable of doing.

As soon as assistants capable of delivering lectures on chemistry in all branches taught are available, it should be recognised and laid down that the Agricultural Chemist, Burma, shall be free to tour to make himself familiar with problems in the country.

An allotment of Rs. 2,000 at least should be available yearly for travelling allowance in the budget of the Agricultural Chemist, Burma.

(*c*) The insect, fungus and bacteriological enemies of water-hyacinth (*be-da-bin*) might be fully investigated. Chemical sprays have been fairly fully investigated, confirming the fact that only arsenical sprays are likely to be useful. Chemical spraying is merely a means of mitigation of the nuisance and will never get rid of the plant totally.

The absence of a proper insectary in Mandalay might prove troublesome for work with insect pests.

QUESTION 2.—AGRICULTURAL EDUCATION.—(*ii*) Yes. An increasing number of students are offering agriculture as an optional subject in the High School Final examination. This year 518 offered agriculture and it is only about four years since the subject was introduced. A means of disseminating a wider knowledge of agriculture is therefore available, but unfortunately, perusal of the papers shows definite evidence of either little teaching of the subject or none at all. In the larger schools such as the Government high schools, graduates of the Agricultural College and Research Institute, Mandalay, might later on be introduced as assistant masters similar in grade to members of the Educational Service, the diploma of the Agricultural College and Research Institute, Mandalay, being held equivalent to the ordinary B.A. and B.Sc. of the Rangoon University as a qualification. Rates of pay should be identical and recruits should be taken on only to fill existing vacancies. Hence no financial re-adjustment should be necessary.

(*iv*) This applies only to the Agricultural College and Research Institute, Mandalay. Applications for entry to this college are comparatively few although stipends of Rs. 50 per mensem are offered. The reason for this is that better prospects are offered in services other than the Agricultural Service though there is but little difference in the qualifications demanded, added to which there is the fairly arduous nature of the duties involved in service with the Agricultural Department and the lack of *awza* (power or authority.)

(*v*) To get into Government service. In many cases a real liking for agriculture is not in evidence although of course there are exceptions.

(*vi*) No actual figures are available. Many students are sons of small landowners, Government servants and small traders, comparatively few being sons of cultivators who have usually not the means to enable their sons to pass the High School Final examination and so qualify for admission to the Agricultural College and Research Institute.

QUESTION 10.—FERTILISERS.—(*a*) There is very little prospect of greater use being made of artificials at present prices although ammo-phos has proved profitable, both in Lower Burma and in Mandalay. All others are uneconomic at present or barely repay extra cost.

(*b*), (*c*) & (*d*) do not arise.

(*e*) No. It is doubtful if sufficient investigation will ever be possible apart from crop increases due to manuring. The knowledge of secondary changes in the soil as a result of manuring is exceedingly important and such results for paddy and tropical crops are very meagre. It is from permanent manurial plots that such results will have to be obtained and in Burma these have only comparatively recently been laid down, except certain permanent plots designed purely as yield tests.

The general shortage of nitrogen and, in many districts, of phosphate also, have been clearly demonstrated. Ammonium sulphate and superphosphate have proved the only useful sources of nitrogen and phosphate for paddy, although ammo-phos is really similar in constitution to the above. For wet lands nitrates are useless; ground bone flour may possibly be of some use in the sour paddy soil of Lower Burma. Potash is rarely, if ever, necessary for paddy. Urea is being investigated but pot experiments so far do not give much hope for useful results.

Sufficient tests with cyanamide and basic slag have not been made to speak with certainty of their efficacy.

APPENDIX.

Note on the Agricultural College, Mandalay.

Results showing applications for entry, etc., are given in the following table :—

	Number of applications.	Attended Selection Board.	Awarded stipend.	Non-stipendiary students.	Resigned.
1924	121	111	24	..	..
1925	36	26	19	..	2
1926	39	27	21 (including 2 Shan students).	1	..
1927	42 (11 non-stipendiary).	28 (2 non-stipendiary).	20	..	3

Failure to pass compulsory examinations, with 40 per cent aggregate, results in withdrawal of stipends. Certain students who have lost stipends on this account have continued studies at their own expense after passing compulsory re-examinations.

Mr. J. Charlton]

Eleven students who entered the college in 1924 have successfully passed the diploma examination in March 1927 and are now stationed at farms in various circles. The remaining thirteen students lost their stipends after one or two years in the college.

The number of students in the college at present is as follows :—

——	Stipendiary.	Non-stipendiary.	Total.
1st year	17	..	17
2nd year	12	2	14
3rd year	6	3	9
Total ..	35	5	40

The college is therefore not attracting enough students to keep it filled with a good type of student. There are several reasons for this—

(1) At the present moment there are splendid opportunities in Burma for students to enter the faculties of forestry, engineering, medicine, etc., in the Rangoon University, in addition to vacancies in the Burma Civil Service, including the co-operative branch of the latter. In other words, the young Burmese student who has passed the High School Final at present is confronted with exceptional opportunities. The standing of the Agricultural Department is not such as would attract promising Burmese students if vacancies in other services are available.

(2) The diploma of the Agricultural College and Research Institute only qualifies for employment in the Agricultural Department and is quite useless as a qualification for any other service. Affiliation is desirable to give status to the college. A few prospective candidates have in the past withdrawn their applications for entry in this college when they found that this college does not give a university degree. Of the number who do not apply at all for the same reason no figures can be obtained.

(3) The smallness of the cadre of the Agricultural Department, in my opinion, accounts more than anything else for the reluctance of young Burmans to join the college. With only about 98 Senior Agricultural Assistants and 19 provincial posts sanctioned, the college as a teaching institution has a very limited scope. Students enter only with a view to getting into Government service at present.

Affiliation.—The 1926 Burma Agricultural Department Memorandum * gives certain details on this subject.

The University agreed to affiliation in 1924, *i.e.*, before the college was actually opened, on certain terms. These terms were all complied with except one, *viz.*, the institution of three professorial chairs in major subjects —agriculture, agricultural botany and agricultural chemistry. An annual charge of Rs. 10,800 would have been caused by founding such chairs. Possibly other reasons for not pushing affiliation existed at this time but, if so, I am not aware of them. At any rate in August 1924 the Ministry of Agriculture decided to postpone consideration of the matter for a year.

In the first half of 1925 an attempt was made to convert the four years' course for High School Finalists into a three years' course leading to a degree in agriculture, entrants for the course to possess the Intermediate Science or Intermediate Arts in suitable subjects, the aim being to reduce the amount of teaching and to render more time available for research. This scheme had no possibility of success for the following reasons :—

(1) There are not available sufficient Intermediate Science or Intermediate Arts students in Burma to fill the Agricultural College, *i.e.*, there are not sufficient numbers of such men at a loose end, the majority desiring to proceed to the complete degree stage.

(2) The total length of time necessary to obtain the B.Sc. degree in agriculture would have been five years under such a scheme.

(3) There is no real necessity to spend five years in obtaining the B.Sc. in agriculture.

* Not reprinted.

Only about four suitably qualified men applied for entry in 1925 under the above scheme; so sanction was obtained to run a three-year course for a diploma only. This course is now being pursued.

On return from leave in November 1925 I suggested that affiliation under the following scheme might be possible :—

(1) The course for the B.Sc. degree in agriculture should last for four years only.

(2) The first two years should be spent either in the Intermediate College, Mandalay, or other affiliated college of the Rangoon University taking the following subjects—English, Burmese, chemistry, physics and possibly mathematics.

(3) Such students would be stipendiary students of the Agricultural College and Research Institute, Mandalay, but would be entirely under University control until they passed the Intermediate Science. Failure to pass compulsory examinations would, of course, entail forfeiture of stipends. Further, a few private students taking the right subjects might be found willing to join the Agricultural College and Research Institute, Mandalay, for the subsequent purely agricultural course. This would help to reduce wastage, which is normally high, fifty to sixty per cent.

(4) Passed Intermediate Science students would enter the Agricultural College and Research Institute, Mandalay, for a two-year course in agriculture proper, *i.e.*, agriculture, agricultural botany, agricultural chemistry, entomology and mycology. I find that in two years, with such a course, students would be able to devote more time to these subjects than they do at present in the three-year diploma course.

The scheme has never come up officially before the University authorities because it has been pointed out by the Principal, University College, that he would strongly oppose the scheme as he considers that stipends of Rs. 50 per mensem should not be given to High School Finalists. The University did not object to this in 1924 and it is not clear why it should do so now. It is stated that agricultural students will be able to compete for posts in other services with students who have paid their own educational expenses. This is not the case, for successful students are bound down by legal agreement to serve for three years in the Agricultural Department, whereas unsuccessful students are required to pay back stipends in certain cases. The most important point is that stipends of Rs. 50 are not attracting sufficient numbers of students. This department will be glad to reduce stipends as soon as the flow of applicants materially improves.

The Agricultural Department is quite ready to consider unification of stipends when all departments can agree.

The weakness of any scheme affecting the Agricultural College and Research Institute educational course at present is the uncertainty as to the future of the college when the cadre is filled.

Cost of teaching course in the Agricultural College and Research Institute, Mandalay.—It is not possible to give really accurate figures, inasmuch as stores and apparatus used for research and teaching are not entered up separately. One store-keeper for each section could probably not do this. Further, the costs for teaching, given below, comprise capital expenditure on the library and furniture of the college, whereas these shou'd be partly debitable against research. The pay of the Indian Agricultural Service staff is not included except the allowance of the Principal, Agricultural College:—

	RS.
1923-24	*Nil.*
1924-25	73,823
1925-26	68,679
1926-27	82,606
1927-28	50,100

Part of the budget headings are not distributed in 1927-28. Hence add Rs. 18,000 for teaching staff and peons and Rs. 14,000 for the Principal's establishment. A total allotment of about Rs. 82,100 for 1927-28 is, therefore, budgeted for.

Purchase of furniture was completed by 1926 but no budget for purchase of library books for 1927-28 is included in the above figures.

It is evident that this Province is spending less than Rs. 1,00,000 per annum in agricultural education in the Agricultural College and Research Institute, Mandalay, even if, say, twenty-five per cent of the pay of Indian Agricultural Service officers is debited against agricultural education.

Staff of the college.—Details are given in the prospectus.

Oral Evidence.

63929. *The Chairman:* Mr. Charlton, you are Principal of the Agricultural College, Mandalay?—Yes.

63930. That is the only agricultural college in Burma?—Yes.

63931. Would you give the Commission, quite shortly, an account of your own training and past appointments?—I took my science degree in the Manchester University with Honours in Chemistry; then came the War, during which I was three years overseas; immediately afterwards I was appointed to this college, and I have been here since, that is to say, approximately seven years. In the first place, I was appointed Agricultural Chemist, and three years later I was appointed Principal in addition to my other duties.

63932. Apart from your duties as Principal, you are also working as Agricultural Chemist?—That is so.

63933. I understand that you are anxious to be placed in a position in which you can tour rather more freely than is at present possible; is that so?—Yes; I consider that at the present moment I am not able to tour enough to get an adequate knowledge of the agriculture of the country, and as Agricultural Chemist one must be thoroughly familiar with local problems; it ought to be said, too, that at the moment I am acting as Agricultural Engineer, and that of course prevents me from touring.

63934. How far do you think a considerable amount of touring would be compatible with the discharge of your duties as Principal?—It would be exceedingly difficult to tour much while acting as Principal, and I should say a hundred days a year is the maximum I could do, without interfering with my work as Principal; that is to say, I should largely have to tour during the period between the end of March and the middle of June, when the college is shut down.

63935. You give us a very full account of the history of the college particularly attaching to getting the right type of student in sufficient numbers; I should like to know whether the situation is improving?—According to numbers it has slightly improved, and the type of students we have got this year in June is better than in any previous year. But so far as I can see, in about four years' time all our cadre will be completely filled up, and I do not know what we can do after that regarding teaching here.

63936. Will your cadre be a young cadre when it is filled up, taking it as a whole?—Yes.

63937. So that the number of posts falling vacant year by year will be very small?—Very small indeed.

63938. Have you had through your college any boys who went back to their farms?—Not one.

63939. Taking the average student trained in this college, what grade of post do you regard him as fitted for when he leaves the college?—For the Subordinate Agricultural Service; that is actually the one he is appointed to; the pay is Rs. 150 (on probation for two years) rising by Rs. 7-8-0 to Rs. 220; then there is an efficiency bar, and a subsequently rise to Rs. 300 by increments of Rs. 10 per annum.

63940. Now you have, superimposed on your existing difficulties, the prospect of having to find men for the Superior Provincial Agricultural Service?—I have no real knowledge of that; that is still in the melting pot as far as I am aware at the moment.

63941. Amongst the reasons that you give for the unpopularity of the Agricultural Service amongst Burmans, you mention the absence of pelf and power; is that what you mean by *awza*?—It is a bad translation.

63942. What is a better translation?—*Kudos* gives the meaning better.

63943. You are under an obligation to students who obtain diplomas to give them posts in your department?—Yes.

63944. And they, in their turn, are under an obligation to place their services at your disposal?—They are compelled to do so by a legal bond.

63945. How old are they when they leave the college?—From twenty-one to twenty-four.

63946. Do you contemplate raising the qualifications for admission to the college in the near future?—On the whole, I do not think that is advisable in the immediate future. I have given a note of my scheme.

63947. You mention there the Intermediate Arts or Intermediate Science examination?—When we take entrants possessing the High School Final examination qualification, it will be a four years' course, two years of which will be spent either in the Intermediate College here or in Rangoon, and during that course they would do a training which, strictly speaking, is not agricultural.

63948. Does the distance which separates this place from Rangoon offer some obstacle to the complete co-ordination between the two institutions which one would look forward to in the future?—We have an Intermediate College here which is part of the University, and there ought to be no difficulty, therefore, in having co-ordination and contact. On the other hand, up to the present there has been no co-ordination at all between the Rangoon University and this college.

63949. Does the University carry out any scientific work here?—No.

63950. What part of the University is here?—An Intermediate College.

63951. And nothing else?—Nothing else.

63952. Where do most of your students come from?—Lower Burma.

63953. From the rural districts or the towns?—I have not actually gone into those figures.

63954. Are many of them sons of cultivators?—Very few indeed.

63955. Would you like to see the University taking a more active interest in matters touching the welfare of the countryside?—I think there is much to be said on both sides concerning that, whether the University should take up applied work or confine itself to purely theoretical work; I am not quite decided in my own mind whether the University should interfere in applied work.

63956. Are you familiar with the missionary school at Pyinmana?—I know it, and I have visited it on perhaps three or four occasions.

63957. Do you know how the school stands in the public estimation?—It is an American Baptist Mission school started as an experiment. It is still in its early stages. It was established, I think, four years ago, and it is only fair to wait longer before giving an opinion as to what it is worth.

63958. I think the only comment you make about the equipment here is the absence of an insectary?—Yes.

63959. Are there any other points you would like to mention?—I think the equipment is really excellent.

63960. In answer to Question 10 (*a*) on fertilisers, you say "There is very little prospect of greater use being made of artificials at present prices although ammo-phos has proved profitable, both in Lower Burma and in Mandalay." Has it proved profitable by a considerable net margin?—Yes.

63961. Do you think there is a future before ammo-phos?—Yes, provided that the price relatively with the price of paddy is low.

63962. Is any commercial firm advertising and pushing the sale of ammo-phos?—Not in this country.

63963. Is it your view that further research on fertilisers is advisable?—I think so. For instance, at the present time, I am experimenting with urea which ought to be a really splendid fertiliser, and I find it is not so efficient for paddy as sulphate of ammonia, though one would expect that it would be. I am now setting out to find the reason for that.

63964. Do you consider that, when a research worker has to do a certain amount of teaching, the mutual reaction as between teaching and research is valuable?—Not with teaching to the standard to which we do here.

63965. The teaching is not high enough?—It is too elementary.

63966. Are your college students well up in chemistry?—Very few of them are; perhaps one in ten is, not more.

63967. They do not take naturally to it?—No.

63968. Are they weak in any particular subject?—They are weak in English in particular.

63969. How about arithmetic?—It is fairly good, on the whole.

63970. *Sir Thomas Middleton:* When the college was first designed, what class of students had you mainly in mind: diploma students or students who would prepare for a degree?—Diploma students.

63971. Was it a three years' course that was contemplated?—A four years' course.

63972. These students were to come to you after passing the School Final examination?—Yes.

63973. The position in which you find yourself at present appears to be very much the same as that in which the Poona college was some thirty years ago?—Very much the same, I think.

63974. There was, then, a demand for engineering and other students, and the prospects in the other services seemed much better than those of agricultural students. The University of Bombay would not offer a degree; there was only a diploma, and the number of students was very small?—Yes.

63975. That state of affairs lasted in Western India for fourteen or fifteen years?—Yes.

63976. How long, do you think, is it going to hamper you in Burma?—Unless the cadre of the department increases considerably in the next four years, it will mean the end of the college as regards teaching. Alternatively, our students would have to be accepted in certain other departments of Government.

63977. But the cadre of your department, so far as my memory goes, is not very much less than the Bombay cadre, and certainly much larger than the Bombay cadre was when the Poona college began to grow rapidly in numbers?—Assuming that all the students who are in the college at present will qualify, we shall have only about three Provincial Service posts and four Subordinate Agricultural Service posts vacant at the end of that time.

63978. Is it your view that the Burman student would not come to the college unless there was a certainty of employment?—Why should he? He can get equally good terms in other departments, or better.

63979. At present he can. How long will that state of affairs last?—I do not know.

63980. It did not last very long in the case I indicated, and I do not think it lasts very long in any similar situation of which I have knowledge. One very soon finds that the prospects fall off and students are only too glad to think of openings which, a few years before, might have made no appeal. If you take the case of Britain, for example, and will only go back thirty years, I think you will find that there were only a few students in the agricultural colleges there. I have seen a class of four in Cambridge; I have seen the figure rise to three hundred?—You must not forget that in this country there is no zamindari system. We have no landowner class owning large estates, and therefore there is no demand for men with a diploma or a degree in agriculture to go back and work on large estates as managers. We have not got that opening here.

I do not think that kind of opening exists in Western India. To a small extent it exists in Britain. It existed in Germany before the War.

63981. I gather from what you have told us that your real difficulty in getting the University to think of your scheme is that you proposed to pay stipends of fifty rupees to one class of students, and there are no similar stipends for other students?—I do not think that that is quite the case,

because the engineering students get a stipend, and so do the medical and forestry students.

63982. Engineering students must take their Intermediate Science examination before they are eligible for stipends?—I think that before some of these are selected as stipendiary students by these departments of Government, they must have the Intermediate qualification.

63983. But your fifty rupees stipend applies to students who have not got to the Intermediate stage?—This objection was not voiced, so far as I know, in 1924, when the University promised affiliation.

63984. From the point of view of the University authorities the proposal would raise difficulties?—Yes.

63985. Is there any other form of inducement that you can think of which would be likely to bring in students at the Intermediate stage?—I do not think so, for the simple reason that if a man gets to the Intermediate stage, he might as well go on and get a degree which offers him employment in the provincial posts in the major departments of this country.

63986. So that, until these alternative posts now favoured have been filled up, and until the pressure on the students has become considerably greater, you do not see any immediate prospect of any increase in numbers?—That is so.

63987. You question the desirability of Universities taking up applied science. Were you thinking, here, of applied work in under-graduate courses, or of applied work in post-graduate courses?—Post-graduate departments.

63988. Are these post-graduate departments in the Rangoon University?—It is possible to take the M.Sc. degree.

63989. Your opinion, I take it, is that in the interest of the science student himself, he had better adhere to pure science for the first three or four years, until he takes a Master's degree, rather than take up a subject like agricultural chemistry, or agricultural botany?—I think so. I think it is a mistake, in general, to specialise early. You want a good basis first in pure science.

63990. That is so. It all depends on the stage at which one gets a good basis?—Yes.

63991. You do not think a sufficient basis could be got in the case of this University below the M.A. or M.Sc. standard?—I should certainly think not.

63992. How many years' study of science does this mean?—It means five years in the Rangoon University.

63993. It is a long period. Having regard to the language difficulty, the difficulty imposed by instruction in English, would you estimate this five years' period as the equivalent of three-and-a-half years or four years' for English students?—I think it is very difficult to compare them. For instance, it is very common at Home for a boy to take the Inter-Science or Arts examination before he enters the University at all. He takes the Intermediate from school, and so saves a year. There is nothing in this country comparable with that. I am speaking particularly of the man who is going to take the Honours course.

63994. The comparison lies not with the University course only but with the whole period of training. These men taking the M.A. in Rangoon have had five years' study in science, whereas the English student going up for his final science examination may have studied chemistry for six years or more?—Yes, and the English school-boy is better taught too. As a matter of fact, in the High School Final here, in general, the student has not studied any science when he enters the University. In Burma, at least, there are very few schools teaching science in the high schools.

63995. That is true of chemistry and physics as well as of botany and zoology?—Yes.

63996. We have heard while in India that this was true of biological science. In some cases, however, chemistry and physics were being taught in Indian high schools?—I think it is so in the European high schools only, in this country.

63997. It might be argued, with reference to your claim that the Agricultural Chemist should go on tour, that after all the main business of an Agricultural Chemist is his laboratory and his research fie'd and that he has got to wait until local problems are brought in by agriculturists. What sort of answer have you got to make to that criticism?—I think, in answering a question of that kind, one has to come to particular examples. I have been doing some work with Mr. Hendry, the Deputy Director of the Southern Circle, on the infertility of certain soils near Rangoon. These infertile soils are quite important and it is only at the most infrequent intervals that I am able to see the crop growing down there. I think it is helpful to make personal visits. One gets ideas when seeing the things.

63998. Your argument is that, even for the Agricultural Chemist, a close knowledge of local conditions is necessary?—I think so. Most decidedly.

63999. You would agree that the botanist has still more need for touring?—For example, a man here might be working with crops which would not grow well on the Mandalay soil. He must therefore tour.

64000. Is any of the work which you have been engaged in here similar to work being carried on at Pusa; take, for example, your work on "Buffer action" in soils?—I think that I did that many years before they did.

64001. Do you come into close contact with the people who are working on your own subjects at Pusa?—Not at all.

64002. Have you ever attended a conference with other chemists?—Not a conference of chemists. I attended the Board of Agriculture one year, in 1924.

64003. The Board of Agriculture does not give many opportunities to discuss questions of agricultural chemistry?—No.

64004. So that during your service here you have very few opportunities of conferring with agricultural chemists working in other parts of India?—Very little chance indeed.

64005. Supposing that central work in chemistry were to be greatly extended, what bearing would that have on the work which you are engaged in in Burma?—I am not prepared to say it will have much. For my own part I do not believe in making chemistry something separate. I believe in team work on the local problems and the chemist is merely one of several people working on the same subject.

64006. So that local problems condition the whole work?—Apart, shall we say, from some little pet research which the provincial man may have going.

64007. So that the work done at an Indian central institution would have similar value to you to work done in foreign countries, say, a German institution or an American institution?—It ought to have.

64008. Is there any other way in which a central institution dealing largely with chemical problems might be of value to chemists like yourself in provincial laboratories? We hear a great deal about co-ordinating work. Do you think a central institution would be of value in co-ordinating work in the Provinces?—I believe in co-ordination but I do not believe that it would be a good thing to start a large institute for chemistry alone.

64009. You have already told us about your conception of the chemist's place. Perhaps I did not make my meaning clear. If the chemical work at Pusa were to be largely increased (I do not suggest an institute for chemistry) and the staff were strengthened, do you think that that staff could be made use of by the Central Government for securing co-ordination in the work which is going on throughout the Provinces?—On the whole, I think so.

64010. How would you bring that co-ordination about?—I have not thought out a scheme myself.

64011. Would it be by way of conferences between central workers and the provincial workers or would it be by way of visits from some person whom we might, for the moment, call a Director of Research?—I think that these visits are likely to prove troublesome. Departmental and provincial difficulties might occur. The Minister, for instance, might not approve.

64012. Supposing there were a very able chemist holding some such title as Director and it was part of his function to visit the provincial institutions, what advantage would you be likely to get?—The local chemist would get no advantage. He would not know whom he is working for. He would be working for two masters. That would not do at all.

64013. Anything in that line, you think, would not be helpful to the progress of research?—I did not mean that. It might be done by conference or something of that sort.

64014. I was coming to that. Anything in the way of inspection would not be helpful?—Certainly not, in my opinion.

64015. If visits of a central officer took the form of conferences then your opinion is that they might be helpful?—Yes.

64016. In answer to Question 10 (*e*) you say that knowledge of secondary changes in the soil as a result of manuring is exceedingly important. Have you any indication that this is the case in Burma?—We have had no exact means of verifying that, or more properly, it has not been attempted hitherto.

64017. What secondary changes had you in mind mainly?—An increased rate of loss of calcium carbonate and therefore, perhaps, the tendency for the P_H value to become lower.

64018. Speaking quite generally, is there any tract in Burma where there is a great deficiency of lime?—Most decidedly.

64019. In Lower Burma?—Yes. Practically all the paddy-growing districts of Lower Burma are definitely sour.

64020. Some one told me that the lime content in the Mandalay canal area is high?—It is usually between one and two per cent in the Mandalay canal area.

64021. What is the P_H value in these areas?—It is about 8.2. As a result of my preliminary work I found that the Mandalay canal area is sour. That is one useful bit of information that has come to light.

64022. What would you consider sour for a crop like rice?—There are indications that you want a special variety to stand the sourness when you get P_H 5.5, in order to get the maximum yield.

64023. Several of our British crops can stand a great deal more?—I know a special soil with a P_H value of 3.5, which would not grow anything. That was a special case, of reclaimed land.

64024. I understand that rice is very tolerant of acidity?—It is. What I wanted to say was that there are indications that some varieties evolved by botanical selection suit sour conditions better than others.

64025. Have you any indications as to the point at which the effect is likely to prove detrimental?—It has not been made a problem by itself.

64026. It is not the case that crops will not grow on your soils because of the absence of calcium carbonate?—I do not think so. Not yet.

64027. *Mr. Calvert:* Do the duties of Principal interfere much with your research work?—Recently, during the last three or four months, they have done so, but that is because in addition to the other jobs I have been acting as Agricultural Engineer and the total duties are altogether too heavy.

64028. What is the idea in having a technical adviser in charge of a college? Is it to secure efficiency or to save money?—I think it is both.

64029. *Dr. Hyder:* I understand that there are not many graduates in science of the University of Rangoon who are prepared to work under you as research students?—As a matter of fact, the question scarcely arises because I find these men will not come. I have the greatest difficulty in getting research assistants in my chemical branch. I offer from Rs. 150 to Rs. 300 but no Burman is applying.

64030. Is it because of the smallness of pay or because there is not much importance attached to the Department of Agriculture?—Both these reasons apply.

64031. What are your relations with the University of Rangoon? Do you, as Agricultural Chemist, find a place on any of the boards or faculties of the University of Rangoon?—No.

64032. How many faculties has the University of Rangoon got?—I am afraid I cannot answer that because it is rather out of my line; but I believe there are about twenty.

64033. Do you examine candidates for the B.Sc. degree?—I was asked to do so but I refused because I simply had not the time to devote to it.

64034. The University of Rangoon has not got a Faculty of Agriculture?—No.

64035. *Professor Gangulee:* Does it have a Faculty of Science?—Yes.

64036. *Dr. Hyder:* Do you know the constitution of the University of Rangoon?—I am afraid I am not competent to discuss the Rangoon University. I have not carefully studied the constitution or the University Act.

64037. Does anybody from your college sit on the Board of Studies for Chemistry?—I believe the Director of Agriculture is on the Board for Biological Sciences. Perhaps that is enough.

64038. *The Raja of Parlakimedi:* May I know what progress you have achieved with regard to the eradication of weeds and plant diseases?—The water-hyacinth weed is the only one of which I have had any experience. I found that, amongst the sprays I have tried, the only ones which showed any possibility of combating the pest were arsenical sprays; and arsenical sprays were ruled out on the ground that cattle eating the water-hyacinth would be liable to be poisoned.

64039. Is there no other weed that troubles the local cultivator? There is one weed which creeps along the ground; it has small leaves and is very sensitive?—It is not a weed of Upper Burma and my knowledge of Lower Burma is not enough to say whether it is a real pest there in the paddy fields.

64040. I am referring more especially to the grazing grounds and paddy *bunds*?—I am afraid I am not competent to speak on that point.

64041. Are you tackling any of these plant diseases in the college laboratory?—They are being tackled by the Mycologist.

64042. With any appreciable amount of success, do you know?—I am not able to say what success has been met with in this subject; it is a very difficult problem indeed.

64043. *The Chairman:* Are you responsible for the research work carried on in the college or is it the Director who is responsible?—I am responsible to the Director for a certain amount of research work, that is to say, work carried on in the laboratories and in the college area, but not for outside work. Every expert here has the right to approach the Director direct if necessary, and this is a new arrangement (*i.e.*, the Principal being in charge of research work as well as teaching).

64044. *The Raja of Parlakimedi:* Are any scholarships given?—Practically every student here is a stipendiary student. Of the forty students that we have, as many as thirty-five are stipendiary students.

64045. In addition to the Government stipendiaries, are any scholarships given by the local people in order to encourage research work?—None at all.

64046. You say in your note, in answer to Question 2, that the number of students studying agriculture is increasing but that the results shown are very poor because of the want of proper teaching. Is it impossible to get suitable teachers in these schools?—You are speaking of the High School Final in which students can take agriculture?

64047. Yes?—Unless the Education Department consents to take teachers who are graduates, or men possessing a diploma of this college, as teachers, I can see no possibility of the teaching of agriculture improving in those schools.

64048. Do you not think that when they handle that subject they should have qualified teachers?—Most decidedly.

64049. There is no pressure upon the management to have qualified teachers at present, I take it?—No, for the simple reason that agriculture is not an examination subject in the High School Final, properly speaking.

64050. It is not taken as one of the subjects?—It is not compulsory.

64051. You say that artificial manures are not made use of because of their cost. Are the local cultivators in the habit of using green manures?—No, not in Burma. The Burman cultivator does not see the sense of growing a green manure crop and not harvesting it.

64052. He will not do it just for the sake of enriching the soil?—No.

64053. Have you tried what they call in our Presidency the *dhaincha* plant for paddy?—Yes.

64054. Does it do well here?—Fairly well.

64055. Would it not meet the situation here? It is a very good nitrogen supplying plant?—I have not made a particular study of it myself, and I think on the farm here we prefer to use leguminous plants like *pelun* which is the Burmese name for it; I do not know what the English equivalent is. It is not the same as *dhaincha* (*sesbania aculeata*).

64056. Is it a gram?—No, it is a small pea-like plant.

64057. It is used for other purposes also, I presume, whereas *dhaincha* is not?—Yes.

64058. In your other note it is stated that improved sugarcane furnaces are getting more and more popular and that an increase in their numbers is also very evident?—I do not think that the increase is very evident; the numbers are growing, but the unfortunate thing is that in the year 1925 the Agricultural Engineer's staff was actually reduced, with the result that his programme for 1926 could not be carried out and the work received a set back.

64059. But in your other note you say there has been an increase?—Yes, but that is over a period of, I think, four years. At present we have orders for seven or eight of the improved type and I am sending a man out this week-end.

64060. So that there is no doubt about their popularity; if people are only shown the furnace they will take it up?—Yes, that is so.

64061. And therefore the present obstacle is want of staff?—Yes, and further, the field is not very great in this country. I think only about 20,000 acres of cane are grown.

64062. It is not popular in Upper Burma, I suppose?—Very little cane is grown.

64063. Not even as an irrigated crop?—It is grown for chewing locally. Most sugarcane in Burma is grown under rainfall, not under irrigation.

64064. *Sir James MacKenna:* Have you a College Council in connexion with the college?—Yes.

64065. What are its functions?—It is concerned entirely with questions which crop up concerning teaching and the programme of studies.

64066. *The Raja of Parlakimedi:* Its function is advisory?—No, I would not call it advisory. If the head of a section suggested a material alteration concerning the teaching of a certain subject, the decision would go on a majority. In practice, however, no such case has ever arisen. If a man suggests a change and the change seems reasonable, it is effected, provided of course it does not interfere with the Government's sanctioned prospectus.

64067. *Sir James MacKenna:* What is the relationship of the Director of Agriculture to the college?—He is the immediate superior officer of the Principal and, as such, all matters concerning the college go to the Director as the next man to deal with them.

64068. Would you agree that, except in chemistry and physics, provision for teaching in the sciences related to agriculture at the University of Rangoon has been extremely limited? For instance, have you a Chair in Botany yet?—I am not quite certain whether a Chair in Botany exists or not.

64069. So that, therefore, the Intermediate Science students coming to you would almost entirely have taken the group of chemistry and physics?—Yes.

64070. Is it the case that an Intermediate Arts College was planted on this site about two years ago?—Yes.

64071. Do you think there is any danger, in the event of the teaching side of your college falling off, of its being turned into an Arts College?—I think we might find an Intermediate College in part possession of the building.

64072. You therefore think that the research side of the college should be strongly emphasized as apart from the teaching side?—Yes. For instance, I have working with me now a Forest Chemist. I should like to see research work concentrated, as far as possible, in this building, because that would be suitable for the purpose, rather than have it in the Rangoon University. The reason for this is that the equipment in this college is particularly adapted to research.

64073. In view of the possible danger which might affect research by the greater emphasis on Arts education which would follow if you anticipate a falling off in the number of students on the agricultural side, would it be a good thing to suggest a separate teaching building here and a separate research institute?—The trouble about that would be that, if you took away teaching from this building, there would be several well-equipped laboratories vacant.

64074. If you expand the idea of bringing in other scientific research in the Province, such as forestry, under one roof, would it not solve the difficulty?—I do not think that the idea would be acceptable to many of the other departments. You have the Forest Department Silviculturist in Maymyo and they would not like Mandalay as an alternative.

64075. When did the affiliation movement break off?—In 1924. We have never made a serious attempt to get affiliation since 1924.

64076. As far as I remember, one of the difficulties was the teaching of mathematics?—Yes.

64077. You point out that it fell through because it amounted to making the Professor of Agriculture, the Professor of Agricultural Chemistry and the Professor of Agricultural Botany Professors of the University?—I think that was the most serious objection.

64078. What was the extra expenditure involved?—Rs. 10,000 per annum, simply because each of these three Chairs would carry Rs. 300 a month.

64079. The point was that although at the present moment you have these Professors of Agriculture, Agricultural Chemistry and Agricultural Botany here, if you were affiliated to the University they would become Professors in the University and therefore would be entitled to Rs. 300?—Yes. They would have to be paid by the Agricultural Department, and not by the University; hence the difficulty. I am not advocating it (*i.e.*, affiliation) on this account at all.

64080. In view of the fact that, within a very brief period of years, the department will have been recruited pretty well up to the maximum, and that, as you point out, the number of students coming forward will be very small, do you consider that if the college were affiliated and if it were distinctly laid down that students possessing a B.Sc. degree in agriculture would be of equal status with the other students possessing a B.A. or B.Sc. for appointment in Government service, that would keep the college going?—Decidedly.

64081. Do you think, in an agricultural country like this, a B.Sc. in agriculture is as good as a B.A.?—I think he must necessarily be rather better.

64082. *Professor Gangulee:* Taking the last point raised by Sir James MacKenna, was it not the recommendation of the Agricultural Committee in 1925 that passed students from the Agricultural College should be employed in other branches of the public service?—That was one of the recommendations. As a matter of fact that was not an original recommendation. The idea was contained in the 1919 re-organisation scheme. The college was started, firstly, with a view to train our own staff and, secondly, to train a number of men who should go into other departments. That was the declared object in 1919: I do not know why it was not carried out, but I think it has seriously reacted on the prospects of this college.

64083. None of your students have been taken into other departments?—The question does not arise now, because we can take them all at present.

64084. What is the composition of the College Council?—It consists of the Principal and the heads of all teaching sections.

64085. How often do you meet?—Only as necessity arises. We find that we have too much work to do to meet oftener than is strictly necessary.

64086. Does the College Council discuss problems of research?—Not at all.

64087. Who settles the research programme?—The Director. We have a meeting once a year at which each officer presents his programme of work; that is gone through and fully threshed out, and my special duty is to see that the officers at Mandalay carry it out.

64088. Is that research programme for one year or for a number of years?—For one year only.

64089. Can you tell us whether your scheme of affiliation was placed before the University authorities officially?—Not so far as I know. It only got, I think, to the stage of an informal meeting between the then Development Commissioner, Mr. Chalmers, the Director of Agriculture, the Principal of the University College and myself. The matter began and ended there.

64090. *Sir James MacKenna:* Was that in 1926?—Yes.

64091. *Professor Gangulee:* Could you tell us why the matter did not proceed further?—The Principal of the University College declared that he would strongly oppose the affiliation on several grounds, the most important being that High School Finalists ought not to receive such a large stipend as fifty rupees a month.

64092. The Principal's opposition was not official, was it?—No, but it was very weighty. My point was that we did not want to give anything more than was necessary to get the required number of students (twenty-four); we could not give less than fifty rupees, because a sufficient number of students was not forthcoming.

64093. In 1924 when the idea was started, they did not raise the objection; they raised it in 1926 when they were approached?—Yes.

64094. Did they state clearly what was the reason for their opposition?—No; but I do not think the reason was asked.

64095. You give a number of stipends to students; have you ever had occasion to withdraw a stipend?—Yes on many occasions.

64096. On what grounds?—When we find that the student is not one who is likely to be successful either in the course or later on when he gets out into the districts.

64097. But before you offer him a stipend his application goes before a selection board, does it not?—Yes.

64098. And at a subsequent date, if you find him deficient, you withdraw his stipend?—We give him several chances; we do not in general withdraw the stipend before a full year is over; there are three terminal examinations for the student in which he can justify himself; only after repeated failures do we withdraw the stipend.

64099. In 1924 you gave twenty-four stipends, but you withdrew eleven stipends?—Yes, after one year, for special reasons.

64100. You have two Provincial Service assistants; what are their qualifications?—Mr. Ayyar, the Lecturer in Chemistry, is concerned with teaching; he took his degree in Madras. U Po Shin has had a long period of service in the department; I think he studied in the Rangoon College.

64101. With regard to analytical work for the public, that work, you say, is kept to a minimum. Do you have occasional requests for soil analyses from the public?—Yes.

64102. You at present do not give the public any advice or carry out analyses of soil, manures, etc., which they want done?—In general, if I have not made a survey, if I have not got an accurate knowledge of a certain district from which the enquiry comes, I advise a man not to take a chemical analysis of his soil very seriously; if I do not know what results fertilisers give in that locality I decline to give advice, I think it is foolish to do otherwise.

64103. Because you have not got sufficient information?—Yes; we cannot advise until we have a complete soil survey.

64104. What agency do you employ for soil survey work?—Myself and a clerk.

64105. What is the nature of the soil survey?—In the Pegu district, there are a million acres of paddy; it was my intention to go through the whole of it; I did about three hundred square miles, but in the cold weather of 1923 I was appointed Principal and I could not go out any more. Mr. Hendry, Deputy Director, then proceeded to collect soils, and I was pleased with that arrangement, because Mr. Hendry collected them even better than I did myself.

64106. It was not necessary to employ additional staff?—No; if I went out for a month I could provide myself with ample material for a year. I have enough material after such an excursion.

64107. You have mentioned three or four items of fundamental research which you are carrying on here. Do you think such work could be more profitably carried out in a central institute like Pusa than in a station like this?—Our equipment here is equal to any in India. Except for the fume chambers, all our equipment is up to date; we can do anything that is likely to crop up in the chemical line.

64108. You have many other problems of provincial interest which are more pressing; can you get time to attend to these fundamental researches? —In general we must have fundamental research combined with applied work; that arrangement cannot be improved upon.

64109. Whenever you do carry on fundamental researches the results of those are published by Pusa?—Yes.

64110. Could you give us an idea of the cost of education in this college?—There are forty-one students at the moment and the cost per year is Rs. 80,000; that gives Rs. 2,000 per head per annum.

64111. How many have you turned out already?—We have turned out eleven.

64112. On an average it costs you Rs. 80,000 to turn out eleven?—You cannot reckon it that way. At the moment we have forty-one students, and it is costing us about Rs. 80,000 per annum. It is not fair to say that the cost is Rs. 80,000 and we have turned out only eleven, although on the face of it it is true.

64113. In answer to Question 2 (*ii*) you say: "An increasing number of students are offering agriculture as an optional subject in the High School Final examination." Why?—The Educational Department, if you ask them, will tell you that it is because it is an easy optional subject and papers are marked in an easy way. I am doing my best to alter that and I may safely say that last year that reason did not apply.

64114. Do they think it is simply because they get through the examination easily?—That is the opinion of the Education Department; I do not agree with that opinion myself.

64115. What is your view?—They must take some optional subject or other, and they might as well take agriculture as not.

64116. Do you think that the subject may be made interesting and useful by improved method of teaching?—I doubt if teaching alone will do it. You cannot teach agriculture just as a class-room subject, and I am not advocating for the moment the use of an attached farm.

64117. You do not wish to have agriculture as an optional subject in the High School Final examination. You wish to withdraw it from the syllabus?—I do not. If a man reads Dr. Clouston's book, he must benefit to some extent.

64118. *Mr. Kamat:* You could not push forward your scheme for affiliation, because you were not a member of the Senate of the University?—That was not my reason.

64119. Is not the Principal of a college an *ex officio* member of the Senate under the constitution of the University?—I think he is. But we have never been affiliated, and therefore I have never been on the Senate.

I think, as a matter of fact, if we were affiliated, the Principal of this college would become a member of the Senate, and he likewise would become Chairman of the Board of Studies in Agriculture.

64120. If you had been on the Senate, you would probably have had an opportunity of pushing forward your scheme?—Exactly. We have no representation now, and therefore we can push nothing.

64121. You say that the Minister of Agriculture, in 1924, had decided to postpone consideration of this matter of affiliation for a year. Since then, has the Minister of Agriculture taken into consideration any scheme for affiliation, or has he taken any further steps regarding affiliation?—I think he must have done. These things do not necessarily come back to the Principal of the college. A tentative scheme was put up in 1925 for recruiting men with Intermediate Arts or Intermediate Science qualifications and giving them a three years' degree course in this college. That scheme, I think, must have gone to the Ministry, but I am not certain of it. That scheme did not go through because we could not get the men to apply. Only four qualified men applied.

64122. Have you any reason to believe that the Ministry is not taking a firm stand in the matter because they are not prepared to face this expenditure of Rs. 10,000 per annum?—I would not say that for a moment. I think the far more important consideration to the Ministry is the fact that the future of the college is quite indefinite, the problem as to what this college must do in four years' time if the cadre of the Agricultural Department is not increased, and if we cannot get our diploma students into other departments.

64123. *Dr. Hyder:* How many colleges are there under the University of Rangoon?—Three, I think.

64124. All situated in Rangoon?—The University College and the Judson College are in Rangoon, and there is the Intermediate College, Mandalay. Those three comprise the University of Rangoon.

64125. *Mr. Kamat:* You have said that, in the view of the Ministry of Agriculture, the future of the Mandalay Agricultural College is quite indefinite?—I am supposing that that was the view they took.

64126. Meantime, if they could get this affiliation passed, probably the future of the college would not remain in the balance?—That is my view.

64127. If a degree in Agriculture were established, students would be attracted, as they would get employment not only in the agricultural cadre, but elsewhere, and the future of the college would probably be secured?—I think it wants securing in such a way.

64128. *U Ba Cho:* The future of the college depends upon its affiliation to the University of Rangoon?—I would not admit that at all.

64129. It will depend greatly on what we can give to our agricultural students?—Apart from affiliation, provided the diploma students can be taken into other departments, I think we might achieve quite a large measure of success.

64130. But a diploma student can never stand side by side with the holder of a degree from the University, when he applies for any post in any other Government department?—I fear that is true.

64131. Do you not think the time has now come for this subject of affiliation to be again brought before Government?—I do not think it is my work to bring such a matter before Government.

64132. But the Director of Agriculture can do so?—I think it would be better that he should do so rather than I.

64133. You know that the Missionary Agricultural School at Pyinmana is fairly well attended by students who are children of cultivators?—Yes.

64134. There are between fifty and sixty students?—I think it is about that number.

64135. In order to promote vernacular agricultural education amongst the sons of cultivators, would you like to see more schools of this kind in Burma?—That school is a particularly expensive school.

64136. That is because they make it expensive. The buildings cost a great deal. We can impart education in agriculture in modest buildings?—

It depends on what you are striving for. Is it something on the lines of the Punjab scheme, or the Bombay scheme?

64137. The Pyinmana scheme does not cost us much. It does not necessarily follow that we should have very big buildings for primary agricultural education for the sons of cultivators? Do you agree with me?—Partly.

64138. You do not want very elaborate arrangements; you do not want laboratories or class-rooms?—We do not want laboratories at all. We want competent staff to teach, and that we cannot get.

64139. It need not necessarily be expensive. We could devise means to make education cheap, to suit the requirements of the people?—You could not put in charge of such a school, in this country, a man on less pay than Rs. 150 to Rs. 300.

64140. You must be prepared to spend that?—Quite.

64141. You know that the University College and other colleges and schools, such as the veterinary school, have governing bodies, of which the principal of the school or the college is *ex officio* executive member. Do you think it would be a good thing to have a similar body for your college? —If you want any practical work at all done, then the less of this sort of thing you have the better.

64142. You told me that you were very anxious to affiliate the Agricultural College to the University, that there was a small meeting consisting of yourself, the Development Commissioner, and the Principal of the University College, that you represented the matter to Government and pressed your point, and yet you were defeated. Supposing you had a strong governing body, they would have taken up the matter, put pressure upon the authorities concerned and seen the thing through. I am only giving you an example?—It might have been helpful.

64143. Do you not think that a governing body consisting of yourself, the heads of the several departments, and people who are interested in agriculture and who have some influence in their own communities, would carry a good deal of weight?—It seems to me that the powers of such a body would have to be very carefully defined, because, after all, the Director of Agriculture would either have to attend such meetings himself to present his views, or, failing that, his opinion would, I think, have to be given before any decision could be taken on any important point. It seems to me that it would be difficult to work.

64144. I draw the conclusion that you consider the post of Agricultural Engineer to be a very important one for Burma, especially at this stage of her progress?—Most decidedly I do.

64145. The holder of the post has resigned?—Yes.

64146. And the assistant has also submitted his resignation?—Yes.

64147. Do you not consider that this stage of affairs is very unsatisfactory?—Yes. It is all bound up with the fact that the Agricultural Department is more or less looked upon as a subordinate department at the moment. The Assistant Agricultural Engineer is Rs. 80 a month worse off here than when working in a similar capacity in the Insein Engineering Institute. There he has free quarters, free light, free water and so on. Here he gets nothing of that sort. There he has prospects, but here he has none.

64148. In the case of the Agricultural Engineer, he is not made an officer of the Superior Service?—He is to be in the new Provincial Service formed in Burma. I have heard a good deal about it, but I have not seen anything published at all.

64149. Do you not think the post of Agricultural Engineer is equal in importance to that of the Agricultural Chemist or the Botanist?—Most decidedly I do.

64150. Would you recommend that this officer should be of the same status as other superior officers?—Yes, provided he is a man having similar qualifications.

64151. I am not talking of the person; I am talking about the post of Agricultural Engineer. Do you not consider that the post of Agricultural Engineer should be on the same level as that of any other superior officer? —I think it advisable that it should be, but I think that, if so, you must recruit a man of equal attainments.

64152. First you must create the post, and then get the person. Would you like this post to be in the Imperial Service grade?—I do not know that I would like to see it in the cadre of the Agricultural Service. I think the post of Agricultural Engineer should go on the superior establishment, that is to say, the new Superior Provincial Service which is approximately equal to the present Indian Agricultural Service.

64153. Do you remember that the Agricultural Committee of 1924 recommended that this post should be kept on the same level as that of the Chemist or the Botanist?—Yes.

64154. Do you not agree with that recommendation?—I do, on general grounds.

64155. When candidates for stipends put in their application they have to mention the occupation of their parents, whether any of their relations possess lands, and so on. Do you keep a record of these particulars in your office?—I have the actual original applications which I can turn up if I want to.

64156. Do you keep a record of the profession that they follow after they have passed from your college?—Hitherto passed students have gone into the department.

64157. Do you keep, so far as possible, records of the students who have failed to pass?—In general, they are not anxious to keep in touch with us. Some of those who have failed have gone to the Rangoon University.

64158. In one of your notes you say that in 1927 the number of students who applied for admission was forty-two and that stipends were awarded to twenty of them; lower down you say that there are at present only six stipendiary students and three non-stipendiary students. How do you account for this sudden decrease in the number?—You mean, in the present third year?

64159. Yes?—Those who were recruited in 1925 were a particularly bad lot.

64160. When were they selected?—In 1925. They are now just at the beginning of the second term of the third session.

64161. When did your last selection take place?—The last one was in June 1927.

64162. Did you get any more non-stipendiary students for the year 1927?—We did not recruit any because none of them knew Burmese. Unless they knew Burmese there was no good their coming into this college. That is the sanctioned rule.

64163. Out of these twenty students who were awarded stipends, only seventeen attended the classes?—Actually twenty were selected and three subsequently resigned. One of them discovered that he could not get a degree and he therefore thought it would be foolish to come. Another one was a Mahommadan and he could not get his food properly in the hostel. If a man is not a Burman, it may be difficult for him to arrange for his food. He cannot arrange to engage a special cook and he has not the time to cook his own food.

64164. *Sir James MacKenna:* With reference to the question I put as to the prospect of students in your college obtaining admission to the Subordinate Civil Service, the Land Records and the Subordinate Co-operative branch, are these posts at present filled by competitive examination?—I believe so. That is the alteration that has been made and that is worrying us.

64165. Would it help if agricultural subjects were included in these examinations?—No; I do not think it would help very much.

64166. What is the standard of the knowledge of English of students in the college?—It is only fair to say that we are really an applied college and our students' knowledge of English is probably very much inferior to that of the man taking a regular degree. Furthermore, in this college a man has to spend so much time on strenuous practical work that you cannot expect his knowledge of English to be very good.

64167. *Professor Gangulee:* Is the subject of agricultural economics taught here?—Only as part of the regular agricultural course.

64168. By whom?—By the Professor of Agriculture, Mr. Robertson, at present.

64169. In reply to a question by one of my colleagues you said that agriculture is considered a subject of secondary importance. Who considers it so?—The Burmans in Burma generally. That opinion is generally held.

64170. Is it also the opinion of the Legislative Council of Burma?—I am not competent to say.

64171. Is there any officer engaged in research in connection with the problem of water-hyacinth?—I think the study has now been relegated to the limbo of forgotten things. I do not think any one is actively engaged on the water-hyacinth problem now.

Professor Gangulee: But the water-hyacinth remains with you.

64172. *Mr. Kamat:* In the selection of candidates, do you give any preference to those drawn from the agricultural classes? Could you give us an idea as to how many out of those selected are drawn from the cultivating classes?—We have not made that a point in deciding on the candidates; I cannot give you the numbers exactly.

64173. Assuming that the majority of those selected are not drawn from the agricultural classes, when they come to be teachers, it only means that your future teachers will be non-agricultural in origin?—I think that is a rather theoretical objection.

64174. Assuming that you would always like to have your teachers drawn from men belonging to the agricultural classes, do you not agree with my view?—I think it is preferable but I know many successful farmers who are not the sons of farmers.

64175. You do not attach much importance to this theory?—Not a great deal.

64176. *Professor Gangulee:* What is the composition of the Selection Board?—The Chairman is the Development Commissioner, now called the Financial Commissioner, Transferred Subjects. The members are the Director of Agriculture, *ex officio*, the Principal of this college and the Principal of the High School in Rangoon, Mr. French. In addition we had a Burmese Barrister-at-Law at Rangoon. I think it was Maung Ba Tin. We had also Professor Unwin of the Rangoon University, the Professor of Forestry. There may be some slight variation but that is more or less the composition. Two or three years ago we had the Minister himself as Chairman.

64177. *Sir Thomas Middleton:* Reference has been made to your soil survey. Do you attempt to map the soils?—I mentioned the work just to show the progress made hitherto. You can see them in my laboratories when you come round. The surveys are very imperfect at the moment but we have got some definite information.

64178. I take it you are surveying only on a small scale. You do not attempt to trace boundaries in the fields?—We do it in a perfectly general way only.

64179. What is your method of sampling?—By the auger. We take five samples each, both of the soil and of the sub-soil. That makes ten altogether per sample.

64180. To what depth do you go?—Usually six or seven inches from the surface soil. Occasionally I go four or five feet in order to see whether there is any definite change of formation.

64181. Do you find any marked change in a depth of six or seven inches?—Very little.

64182. Have you soils in Burma in which the profiles are very well marked?—Yes. I am now doing work with the Forestry Chemist working under me. The results show variable profiles and therefore I can give you a definite answer.

(The witness withdrew.)

Mr. C. C. GHOSH, B.A., F.E.S., Entomologist, Agricultural College, Mandalay.

Replies to the Questionnaire.

QUESTION 1.—RESEARCH.—(*a*) Entomology is my special subject and the following remarks are based on my own experience. Entomological research should be centralised in the following manner. Systematic entomology should be confined to the Indian Museum which should be developed on the lines of the British Museum. The section of the Indian Museum dealing with entomology should be placed in charge of a properly qualified systematic entomologist with necessary staff. Gradually, systematists in different groups will have to be added. If facilities are offered, Indian entomologists and research students will be available at Calcutta to work on different groups and in course of time will develop into specialists. The different Provinces and Pusa will have only a working collection.

Agricultural entomology should concern itself only with crop pests and should be centralised, with sufficient staff to cover the Provinces. This will afford facilities for workers specialising in the pests of particular crops. As the crops and also crop pests are common to most Provinces, the various Provinces have more to gain than lose by this arrangement, which will ensure greater efficiency with the minimum of cost. To quote one instance, biological control measures which have been attended with marked success in Hawaii, cannot be possible without each Province having a large staff of its own. Agricultural entomologists and the Entomological Section of the Indian Museum will work in co-operation. If the whole of the entomological work be placed under one director, the results may not be so satisfactory. Such a head will require to be paid highly but probably his whole time will be occupied in routine work. Besides, if such a head be a systematist, economic entomology will suffer.

(*c*) *Bee-keeping.*—No work is being done on this subject. The results of recent experiments are given in the Proceedings of the Third Entomological Meeting,* Pusa, 1919, Volume II, pages 770-782. A beginning has to be made with an agriculturist and a staff and the department has to be built up gradually.

QUESTION 2.—AGRICULTURAL EDUCATION.—(*ii*) In rural areas, boys and girls grow up among cultivation. Members of agriculturists' families actually take part in the operations. The children of non-agriculturists too are quite familiar with all operations. Therefore attempts to teach agricultural methods through elementary text-books only create laughter. Methods require to be taught when new crops are introduced and this is best done by actual demonstrations.

(*viii*) (*a*) In elementary education nature study is an urgent necessity. Ignorance about the elementary facts of insect life is appalling. Where, however, the cultivator understands insect life he has been observed to pick out eggs, etc., of injurious insects as soon as they are found on his crops. In any scheme of nature study, the first necessity is to train teachers.

(*b*) In rural areas, school plots and school gardens are not necessary.

(*x*) At present there are several ways of looking at the question of agricultural improvement. The educated classes look at it from the standpoint of the much-hoped-for gentlemen farmers. They say: "Have more agricultural schools and colleges and give the students trained in them lands on preferential terms and easy means of finance." This is really a means of finding an opening for educated middle classes and is not expected to solve the problem of the vast mass of real cultivators forming about three-fourths of the whole population. There is probably no other alternative if the educated classes are expected to take up agriculture. Gentlemen farmers were in existence and even now are. They never put their own hands to the plough but engage paid labour. Their number is, however, decreasing and the real cause is probably fragmentation of their holdings which thus become uneconomic. The rise in the cost of labour contributes

* Not reprinted.

to it and the rise in price of the produce does not affect them very much as the produce is mostly used for home consumption. A corresponding rise in the yield of the soil has not always been possible on account of adverse conditions, including failures.

The conditions vary from Province to Province. There is scarcity of land in Bengal and Bihar, of which I have some experience. Land at one place, about 25 to 50 acres in area, and easy means of finance will attract educated boys. The plan would be to train boys of character, who have read only up to Matriculation, in an agricultural school or college for about two years and then put them to practical work for one year in a farm or better with one who has already settled as a farmer.

In Burma, lands are available. But for several years to come service under Government will remain attractive and hardly any boy will turn to agriculture.

(*xii*) In rural areas traditional hours of teaching require to be changed. Adults as well as children can find time only at night, especially in the busy season. If the teaching can be made attractive, there is always a good attendance.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(*a*), (*b*) & (*c*) Cultivators are always eager for expert advice in their difficulties. They do not want any advice as regards the practices with regard to existing crops. It is an admitted fact that in most cases they grow better crops than in Government farms. Whenever the department has been able to bring a better variety to the notice of the cultivators they have quickly adopted it. I can cite one instance. In my own district in Bankura a soft variety of sugarcane used to be grown. Jackals would damage it and even passers-by would break a few pieces and chew. A hard variety was introduced and it quickly replaced the old soft variety with hardly any efforts by the Agricultural Department. The same remarks are applicable to Karachi gram in Upper Burma.

The idea is to have farms in each district. It is a necessity for experimental purposes. But the farm soil cannot be expected to be representative of the whole district. In such circumstances the best plan is to rent small plots in representative soils and carry out experiments. At the same time it is necessary to explain clearly to the local people the experimental nature of these trials. Otherwise, in case of failures, the cultivators form a poor opinion of Government's efforts at agricultural improvements.

QUESTION 4.—ADMINISTRATION.—(*a*) & (*b*) Agricultural chemistry and botany to be purely provincial, and probably agricultural engineering.

Agricultural entomology, mycology and bacteriology to be central with provincial subordinate staff, each to be administered by a director.

Research in sericulture and bee-keeping to be central but separate departments each under a specialist. Provinces should have separate departments under a Deputy Director.

QUESTION 17.—AGRICULTURAL INDUSTRIES.—(*a*) The number of days of work varies from place to place according to local conditions and facilities for cultivation. In areas where only paddy is cultivated there is leisure for a period after transplanting and then for the whole of the year after harvesting. Where *rabi* or winter crops are grown there is less leisure. Where there are facilities for irrigation, *e.g.*, Kyaukse district and other parts of Upper Burma, the cultivator is occupied throughout the year. The majority of the cultivators have no work after the harvesting of the crops.

(*c*) *Bee-keeping.*—The local hive bee is not suitable. The Italian or other suitable bee should be introduced and colonies and queens made availble at a small cost. There should, at the same time, be facilities for teaching modern methods of bee-keeping and sufficient propaganda.

Sericulture.—The Silk Industry in Burma.—Silk cloth is used very largely in the Province by practically every one, men, women and children.

The figures in the following statements show the value in rupees of the imports and exports for the past five years of raw silk, prepared silk yarn and silk piece-goods (pure and mixed with other material). The

figures are collected from the reports of the Sea-borne and Trans-frontier Trade of Burma :—

Imports.

	1921-22.	1922-23.	1923-24.	1924-25.	1925-26.
	RS.	RS.	RS.	RS.	RS.
Raw silk	67,86,552	86,88,146	95,75,304	1,09,57,169	*1,12,40,467
Silk yarn, noils and warps.	67	..	634	963	† 5,782
Total for raw silk and silk yarn.	67,86,619	86,88,146	95,75,938	1,09,58,132	1,12,41,049
Artificial silk yarn ..	13,664	215	..	1,248	57,625
Silk manufactures ..	39,11,554	51,58,623	40,30,591	57,12,764	*48,18,695
Artificial silk manufactures.	64,499	1,13,373	4,20,121	13,78,471	15,78,519

* *The figures for the Trans-frontier Trade for* 1925-26 *are not available and are taken as the same for* 1924-25. *These imports are almost wholly from China and Japan, mainly China.*

† *These figures are not correct; much of the raw silk from China comes as twisted yarn.*

Exports.

	1921-22.	1922-23.	1923-24.	1924-25.
	RS.	RS.	RS.	RS.
Raw silk	1,82,050	1,31,475	1,74,921	95,882
Silk manufactures	2,60,007	1,80,198	2,73,185	3,56,429

It will be observed from the above figures that the value of raw material imported and utilised in the Province is about Rs. 1,12,00,000. The production in the Province itself is very small. The principal areas of production at present are in the Toungoo, Magwe and Prome districts, with stray rearers in the Shan States and Pakôkku, Bhamo, Myitkyina and Akyab districts. The total number of families engaged in rearing silkworms are about 1,500 who produce not more than about 2,500 lb. of raw silk of the value of about Rs. 21,000 and of a coarse kind which is used locally in weaving coarse *longies* and *Shan* bags.

The weaving industry of the Province is very important but is entirely dependent upon foreign raw material which comes practically wholly from China.

The production of the raw material in the Province is capable of being increased enormously (1) in the existing areas of production, (2) in areas where silkworms used to be reared before and where the tradition is still remembered and (3) among Karens, Kachins, etc., who have not only no objection but are quite willing to undertake rearing, and also among Buddhists who have no objection to rearing silkworms. Among Burman Buddhists, too, in many places the religious objection does not appear to be strict and will cease to be a bar as the economic benefits of sericulture are realised. It can never be expected that all the people in the Province will practise sericulture. Those who are expected to do so form a large number.

There are many places all over the Province climatically suitable for rearing silkworms for about half of the year or more. All the coastal districts and the hill tracts are suitable. In the dry zone districts where, however, mulberry has to be grown under irrigation, and canal irrigation is available, rearing is possible from about June or July to February and about six crops of cocoons can be taken. Many other places in the plains are suitable. In the near future, great improvements are possible in the

existing areas of production by better methods and organisation. The rearers at present grow only small patches of mulberry which they shift either every year or after two or three years at the most. Leaf production is small and there is no inducement to increase this production as the rearers themselves reel their own cocoons and rear only small lots which they can reel, before the moths cut, in the course of about a week by their slow methods. The average quantity of thread produced per rearer in a year is less than two pounds. Facilities for quick disposal of cocoons will bring about increase in production. Arrangements for supplying seed cocoons and eggs from the Maymyo nursery have brought about a large increase in the number of rearers. The other problems are: better methods of growing mulberry so as to have permanent and large plantations yielding abundant leaf supply, arrangements to teach proper methods of rearing and to purchase cocoons as soon as they are formed and reel them properly for the very large demand in the Province itself. The rearers in many places, especially in the hills, are poor and will only be too glad to have cocoon-rearing as a source of income. The quality of the raw silk depends on its uniformity of thickness and continuity and this cannot be secured unless reeling is done under supervision in factories (filatures). Therefore in order to be able to increase production and turn out superior yarn it is essential to make arrangements for purchasing cocoons and reeling them in filatures started among or within easy reach of the rearers. At present the preparatory (or, as they are called, throwing) processes for rendering the raw silk fit to be woven are carried out by the weavers themselves in their old slow and tedious methods. With ready thrown yarn the weaver is relieved of a good deal of tedium and waste and can do more weaving in a given time. The Amarapura weavers do not like to use raw silk if they can get ready twisted yarn and such yarn is nowadays being imported. For greater utilisation of the locally produced raw silk it is necessary to reel it well and place it in the market in a properly thrown condition. It is also advantageous to the weavers if they can get ready dyed yarn. At present dyeing is done by the weavers themselves.

The Burma Sericultural Department has therefore decided upon the following programme of work:—

(1) To secure better races of multivoltine silkworms. The two existing races of worms are of a degenerate type, producing cocoons with only about 1 to 1.5 grains silk content and about 200 to 300 yards filament length. By mongrelisation already two races of worms have been secured which are wholly multivoltine and produce a cocoon with 2·5 and more grains silk content and about 600 yards filament length.

(2) To find out the best method of growing mulberry both in the hills and plains. Testing of different varieties of mulberry is also included in this programme. In the hills especially, where the immediate prospects of expension are more hopeful than in the plains, the problem of mulberry cultivation is peculiar. The villages are situated on tops of hills and plantations on the steep hillsides would be most suitable. Trials in this respect are in progress at Leiktho.

(3) Organisation of rearing as a cottage industry through demonstration. Demonstrations on a cottage scale are being undertaken at the central farms at Hmawbi, Mudôn, Tatkôn, Akyab and Yaunghwe where mulberry has already been put down. In two (Leiktho and Paukkoung) out of the three important existing areas of production, nurseries have already been started which will supply eggs and seed cocoons and also mulberry cuttings to the rearers and will at the same time be demonstration centres for proper methods of mulberry growing and rearing.

The Paukkoung nursery has been entrusted with another important function in connection with the Reformatory Settlement for criminals kept under detention here under the Habitual Offenders Restriction Act. This settlement is situated at Kyauksadaing at a distance of about two miles from the nursery. The settlers are to be taught mulberry-growing and silkworm-rearing. About five acres of mulberry has been put down this year in the settlement with cuttings supplied from Maymyo nursery.

(4) To arrange for reeling in reeling factories started and worked among the rearers themselves as soon as the number of rearers calls for such factories. These factories will purchase the cocoons and reel them, thus at the same time affording work to many girls as reelers and winders. Proposals for starting a factory at Leiktho are under consideration. The

department has to pioneer this work. Reeling factories are profitable concerns and private capitalists are expected to come forward to take them up later on.

(5) To arrange for a small throwing factory at Mandalay to turn out proper kinds of thrown yarn. This is also expected to be taken up by private persons afterwards.

There is no programme for dyeing experiments just at present. It may be thought of later on.

The department has the main nursery at Maymyo which in addition to carrying on research in the races of worms and varieties and methods of growing of mulberry, forms the centre for supplying seed cocoons, eggs and mulberry cuttings and training staff and probationers. On account of the unsuitability of the cold weather months, this nursery is supplemented by a small arrangement for rearing at Mandalay during these months.

THE SILK INDUSTRY IN THE WHOLE OF INDIA AND BURMA.

Introductory.

I began sericultural work at Pusa in 1906 with the late Professor Lefroy, then Imperial Entomologist. The *eri* silk was thoroughly studied and the results published in a joint Memoir by Professor Lefroy and myself (Entomological Memoir, Pusa, Volume IV, No. 1). In the course of this work the Pusa continuous spinning machine was worked out and patented by me. A combined doubling and twisting machine for silk on the basis of the same machine was designed and made. Mr. Coryton worked out and patented a machine for reversing and cleaning *eri* silk cocoons. Some work on *tasar* and mulberry silkworms was also done. All the work in connection with the silkworms was carried out by me. The report which Professor Lefroy wrote after his enquiry as silk specialist in 1915-16 was to a very great extent based on the experience gained from this work. When a separate sericultural assistant for Pusa was available in 1911 I stopped sericultural work directly but commenced it again in 1920 after my arrival in Burma where a permanent sericultural department has now been organised. I have been dealing with Indian sericulture for the last twenty-one years and am conversant with the process of reeling, spinning and weaving. I therefore feel confident in making suggestions for the improvement of sericulture as well as of the silk-manufacturing industry. As the details of neither are generally known, I give short descriptions in order to make my remarks clear. I then deal with the recent enquiries and the trade, and in conclusion suggest what I consider to be necessary for helping the industry.

Part I.

Silkworms feed on leaves of various plants and spin cocoons. The thread from these cocoons is taken out in various ways and woven into cloth. Cocoons from which a continuous thread can be unwound are called reelable. From unreelable cocoons the thread has to be spun much in the same way as from cotton. The entire silk industry is divisible into two clearly defined divisions, *viz.*—

I.—Production or sericulture proper extending up to the completion of the cocoon stage.

II.—Utilisation or silk-manufacturing industry.

I.—Production or Sericulture Proper.

Sericulture in India.

Sericulture in India is concerned with (1) *eri* silk, (2) *tasar* silk, (3) *muga* silk and (4) mulberry silk.

Eri silk.—The *eri* silk is confined to Assam. The worms are completely domesticated and feed on the leaves of castor and another plant locally known as *keseru* (*heteropanax fragrans*). The cocoons are not reelable. The rearing is done as a spare time cottage industry mostly by the animistic tribes. Spinning, too, is done at home with simple hand implements. Weaving also is a home industry. There is only a little profit in all these operations. Tradition is carrying them on for generations and will probably do so in future. There is a large market for the cocoons in the spinning mills

in Europe and there is a small export trade. But as it hardly pays to raise the cocoons on any scale specially for sale, rearing of these silkworms is not likely to extend. In Assam the food plants used are hardly cultivated. The unsuccessful attempts we made to introduce rearing of this silkworm into other parts of India are described in Professor Lefroy's report.

Tasar silk.—The *tasar* silkworm is of a completely wild nature. The female moths have to be tied outside to be fertilised by wild males, no mating taking place in confinement. The worm can be and has been reared in captivity, in the same way as all wild insects can be reared, but as far as my own experience goes, with more than ordinary care and under conditions closely approximating nature. This is not possible commercially. Where rearing is done by the people the eggs are tied on the trees, the worms on hatching crawling on to the leaves feeding at will and spinning cocoons on the trees. The rearers keep watch and scare away birds. Wasps and other insect enemies however play havoc among the worms. The cocoons reared in this manner are generally not as satisfactory as, and fetch a lower price than, those formed wild. The cocoons of the trade are partly reared in the above manner and partly collected from the jungle. The main supply is from the latter source. Although the *tasar* silkworm occurs over wide areas practically all over India, production which feeds the trade is confined to a particular tract where it occurs in large numbers and it pays to collect the cocoons. This tract is the Chota Nagpur districts in Bihar with the adjacent districts in the Central Provinces, Bengal and Orissa. This area is apparently very suitable for the worms as nowhere else are cocoons of the same size and quality met with. As will be evident from these remarks, striking results are not expected from attempts at improving production. The cocoons are reelable. The *tasar* manufacturing industry is an extensive and important one.

Muga silk.—*Muga* silk is confined to Assam. The insect is semi-domesticated. Mating of the moths and spinning of cocoons are within control. The worms have, however, to be left on trees to feed at will and to be watched in the same way as *tasar* worms. The cocoons are reelable and a highly prized golden coloured silk is produced. The production is small and the silk is utilised almost wholly in the weaving industry of Assam. In the case of *muga* too very much cannot be expected from attempts at improving production.

Mulberry silk.—The mulberry silk, the principal silk of commerce, stands on a different footing altogether. All phases of it are within control and in all countries results have been obtained commensurate with well-directed attempts made at improving production. It is possible to improve it in the existing silkworm-rearing areas in India and to extend it into fresh areas.

The Races of Mulberry Feeding Silkworms.—Mulberry silkworms have been reared in different countries from very ancient times and as a consequence many races have been evolved. Some have only one generation in a year, in spring, the rest of the year (about ten months) being passed in the egg stage. These are known as univoltine or one-brooded. Some are bivoltine and have two generations in the year, the winter generation being the longer of the two. Trivoltine races are also met with. Others are multivoltine or many brooded, that is, several broods can be reared in the course of the year. The eggs of the multivoltines hatch in about a week; the worms feed for about three weeks and then spin cocoons; from these cocoons moths emerge in about a week and a half and lay eggs. Ordinarily each brood takes about one and a half months, but longer in winter. Therefore it is possible to have about six or seven crops of cocoons in a year. In actual practice in India only three or four crops are taken. The rainy months are generally avoided, as the cocoons spun in rainy weather do not reel well. Then there are considerations of the availability or scarcity of food. The world's silk supply is obtained both from the univoltine and multivoltine races. The former are reared in Japan, Central China, Kashmir, the Punjab, Near Eastern countries (Turkey in Asia, Syria, Persia, Turkistan, Caucasus, Bulgaria, Serbia, Roumania, Adrianople, Greece, Salonica, Crete and Cyprus), Austria, Hungary, Italy, France and Spain. The multivoltine races are reared in Southern China, Indo-China, Siam, Burma, Assam, Bengal, Madras and Mysore.

There are several varieties among the univoltines, characterised by the colouration of the worms and shape, size and colouration of the cocoons. The different varieties are usually confined to different countries and known by the name of the country, such as Japanese, Chinese, Baghdad, Italian, French, etc. Similarly, there are several varieties among the multivoltines

as well. In India, the following principal ones are recognised, *viz.*, *Mysore* reared in Mysore, *Nistari* and *Chotapolu* reared in Bengal, and *Arakanese* race reared in Assam and Burma. I have designated this race in Burma as *Taungle* race in the reports of the sericultural operations in Burma. In Burma, another race allied to *Chotapolu* of Bengal occurs which has been called *Toungoo* race in my reports.

The univoltine races generally produce superior kinds of cocoons with a larger amount and better quality of silk. The multivoltines produce inferior cocoons. Therefore the countries rearing univoltine worms have a natural advantage over countries rearing multivoltine worms. The climatic conditions determined the establishment of univoltine and multivoltine races in the different countries as described above. The tropical humid climate is unsuitable for univoltine races and the rearing of the univoltine races can only be done in the dry weather, in spring or early winter in countries where multivoltines are usually reared. Such rearing, however, is not always very successful. The chief difficulty with the univoltine races is with regard to the egg stage which, as already stated, lasts for about ten months. The eggs have to be "hibernated," that is, subjected to a low temperature of about 40° F. for about four months. Otherwise they do not hatch regularly and within a few days, and hatching may continue for months at the rate of a few every day. It is impossible to do any rearing in such cases. Hibernation is difficult and satisfactory hatching can hardly be guaranteed in the plains. Moreover, the eggs produced in tropical countries are hardly satisfactory. Therefore they have to be imported every year from France or Italy or Japan, hibernated and issued to rearers at the time of rearing. This requires a special organisation and special arrangements for hibernation. At present each ounce of eggs costs about Rs. 4. The univoltine worms are more susceptible to changes in climatic conditions and are, therefore, more liable to suffer from diseases than the multivoltine worms. High temperature at the time of rearing proves disastrous. Such changes of climate are not constant and vary from year to year. Therefore no schedule of rearing time can be formed. A good deal more has yet to be learnt in order to be able to rear successfully the univoltine races in places where multivoltines are at present reared. There are no such difficulties in the case of the multivoltine races. The eggs do not require to be hibernated and hatch regularly and normally and the worms too, being acclimatised, are less susceptible to climatic changes and necessarily to diseases.

The Existing Races of Worms in India.—The existing multivoltine races in India produce very poor cocoons. They can, however, be improved by mongrelisation. As a matter of fact, to me it seems that none of them is pure in origin and probably all of them are the offspring of crosses. Their life-history has become regular in the course of years and their mongrel origin has now become hidden. In the course of my mongrelisation work I have got two distinct varieties out of the mongrel stock which I have designated "*hybrid*" and "*hybrid Mysore.*" The cocoons of the latter are exactly like the cocoons of the *Mysore* race. This seems to explain the existence of races similar to the *Mysore* race in other parts of India, *viz.*, *China* and *Bulu* in Midnapur in Bengal and *Horupolu* in Assam. The Mysore race is supposed to have been introduced from China, but probably this is not correct. Its superiority over other Indian multivoltines is due to the superior climatic conditions of the Mysore plateau. The life-history of all the Maymyo mongrel races has now become regular and constant and they may pass for pure races. As time passes, under humid conditions of rearing they may show signs of degeneration, producing inferior cocoons. This is probably the reason why the existing multivoltine races are degenerate. They require to be re-invigorated. In South China, a mongrel race is reared under conditions which have not helped the disappearance of all mongrel characteristics. In Indo-China, a re-invigorated mongrel race is reared.

Mongrelisation.—Records of attempts at mongrelisation in India are available from about 1854. These attempts have always been made, as they should be, between the superior univoltine and the inferior multivoltine races. In order to give an idea of superiority and inferiority, I take only two points, *viz.*, total silk content in the cocoons and the length of the filament. European and Japanese univoltine cocoons have about four to six grains of the former and about 800 to 1,000 yards of the latter. The Indian multivoltine races have about 1·2 to 1·7 grains of the former and about 200 to 375 yards of the latter.

Earlier records state that the mongrel races degenerated quickly; in the course of two or three generations, there was heavy mortality and these races were of no commercial value. I have been carrying on mongrelisation for the last six years and my experience is that mongrelisation throws out of regular gear the life of both the races which are crossed. The F generation follows the maternal character, but the brood character becomes very much complicated afterwards. The first F generation of the cross with a multivoltine mother is multivoltine and fairly satisfactory, yielding cocoons much superior to that of the multivoltine parent. The next generation however is univoltine, with few or no exceptions and in these exceptions too when reared the moths are irregular in cutting out and the worms are irregular in moulting and spinning. Unless the worms, which hatch on the same day, moult regularly and spin cocoons within two or three days, there is heavy mortality and the work becomes disgusting to the rearer. To eliminate these defects and to get a multivoltine mongrel race with regular life-history is a long process of elimination and selection, lasting over several years. It has taken me about five years and even after five and a half years occasionally univoltine eggs are laid.

The recent attempts at mongrelisation in India were—

(1) by two French experts, Messrs. Lafont and Grangeon of the Bengal Sericultural Department,

(2) by Miss Cleghorn of Calcutta who now belongs to the Bengal Sericultural Department but carried out mongrelisation work before joining this department,

(3) by M. N. De at Pusa.

The Pusa Sericultural Department has ceased to exist and the Bengal department has given up the mongrel races. In none of these cases was the work carried on sufficiently long (except by Miss Cleghorn) so as to eliminate the defects. The Bengal department gave up mongrels as they did not have any regular season and could not be used for reproduction. Evidently their defects had not been eliminated. The Maymyo mongrels are being reared at Lashio, Maymyo, Mandalay, Leiktho and Prome in all seasons.

(4) The latest attempts are by the Mysore Sericultural Department, carried out by a Japanese expert. From the published accounts it appears that mongrel races yielding good cocoons have been obtained but they do not yet seem to be properly fixed. The records show cocoons with even 3½ grains of silk content and 750 yards filament length in favourable seasons. The best results have been obtained in the back crosses, that is a (fixed ?) *hybrid* × Mysore. This is practically equivalent to a first cross and in such cases the results are always better than in the case of the multivoltine parent. Moreover, rearing was done with only one laying of eggs and therefore evidently with the greatest care, or at least more than the average care which would be bestowed on a large rearing. Still, cocoons with average silk content of about 2½ grains and 500 to 600 yards filament length have been obtained.

From the latest reports of the Mysore department it appears that it is no longer countenancing the fixed mongrels but is trying to make arrangements for supplying F univoltine × Mysore to the rearers. The resultant cocoons have all to be reeled and cannot be used for reproduction. To me it seems that this policy is not sound. Even in the favourable climate of the Mysore plateau, univoltine worms are not expected to do well, at least in all the seasons. The offspring of a cross with them will inherit at least some of the difficulties and will not yield satisfactory results in all seasons. Seed supply will be very expensive. It will be well as long as the State maintains refrigerating plants, imports and rears univoltine races and bears the major portion of the expenses. Under such conditions it will be impracticable to meet the large demand for seed and even if met at a large expense it will be uneconomic. Private seed farms cannot be run on these lines. At present the department supplies about 400,000 layings of eggs and the aided farms about 7,000,000 seed cocoons and these two supplies together are said to meet only a small part of the demand. Therefore in order to be able to supply the rearers with F univoltine × Mysore, for three or four crops of the year, an enormous number of univoltine worms have to be reared. If this be possible, why not rear the superior univoltine races themselves?

(5) By myself in the Burma Sericultural Department. Here the mongrel races do not show any sign of deterioration even after thirty-six generations. On the average, they produce cocoons with about 2.5 grains silk content and about 500 to 600 yards of reelable filament length. Under favourable conditions in the thirty-sixth generation they produced cocoons with 2.8 to 3 grains silk content and about 600 to 800 yards reelable filament length.

The results of Mysore and Burma trials almost convince me that in course of time multivoltine cocoons with average silk content of 4 grains and average filament length of 600 to 800 yards can be produced. It is a question of patient work and time. With such cocoons it is possible to compete with China, Japan and Europe. It is essential to maintain the superior stocks in nurseries or seed farms. If left to the rearers they will deteriorate as the present multivoltine worms have done.

Diseases.—All silkworms are liable to suffer from several diseases, the most serious one of which is known as pebrine. It can, however, be eliminated by Pasteur's method of microscopical examination. The body of the mother moth is crushed and pounded with pestle and mortar and a drop of her blood is examined under the microscope. Such examination is a *sine qua non of* sericulture and has been rigidly enforced in countries where this industry has prospered.

In India, there has been a good deal of controversy over the application of Pasteur's method. It was first of all adopted in Bengal by the late N. G. Mukherji and the only mistake he made was not to adopt the use of the pestle and mortar in crushing the moths. He used a piece of paper and the crushing was done in this paper between fingers. The method was necessarily dirty, but in the case of a severe infestation was sufficient to reveal the presence of pebrine corpuscles under the microscope. In the hands of an illiterate or careless examiner, crushing was probably not properly done and the body was merely pressed so that, instead of the blood, probably the liquid excrement was obtained for examination. N. G. Mukherji has, therefore, been subjected to severe criticism by later investigators. Mr. Hutchinson advocated a method of gut examination and he maintained that in the case of multivoltine moths which required to be examined between the fifth and eighth day of their life, the pebrine corpuscles did not have sufficient time to develop and multiply in order to be revealed in the tissue of the body. It has, however, been proved that pebrine corpuscles are found in the body as early as three days after infestation. Mr. Hutchinson's method is certainly a very clean one but is hardly suitable for adoption under practical conditions in a nursery. Dr. Pringle Jameson was brought out at Professor Lefroy's advice to investigate the problem. His opinion was that Pasteur's methods were applicable to Indian conditions and that sound healthy seed was necessary but improvements in methods of rearing were probably more necessary. I fully agree with him after my work in Burma for the last six years. Given suitable food and sanitary conditions for the worms, eggs examined according to Pasteur's method with pestle and mortar and reared with average care should be successful. The method was called in question because in Bengal after so many years of practice in the Government nurseries there was no disease-free stock of worms. But here Pasteur's method was not at fault. The fault lay with the method of work. The Government nurseries in Bengal did not and even now do not (as far as I am informed) maintain any stock. Every year they get their seed from the villages, examine and rear and issue the resultant cocoons as seed. Absolute freedom from disease cannot be expected in this method. In Burma I am maintaining my own stock and all my worms are absolutely free from pebrine. I am thoroughly convinced that the first necessities are good food, skill in handling and feeding the worms and sanitary conditions and then examining eggs. Diseases will then cease to be of any consideration.

Rearing.—Successful rearing of silkworms is dependent upon—

(*a*) suitability of climate;
(*b*) proper kind of worm;
(*c*) healthy seed (eggs of silkworms are technically known as seed);
(*d*) good food (mulberry leaves) for the worms;
(*e*) skill in nursing the worms.

The worms cannot stand too high or too low temperatures and it is a mistake to try silkworm-rearing unless the climatic conditions are suitable. In most places in India and Burma it is possible to rear silkworms for a part of the year. A good deal more, however, has yet to be learnt in this respect. Many places, which have been judged as unsuitable on the strength of data so far studied, may prove suitable. To take one instance, Professor Lefroy considered Mandalay to be suitable in December, January and February and Upper Burma generally as unpromising. Actually, Mandalay has been found suitable from about June to February.

The question of the kind of worm has already been discussed. In places like Kashmir and the Punjab the univoltine races are being reared with success. In almost all other places, especially in the plains, a multivoltine race is required.

The question of disease has also been discussed. Elimination of disease by Pasteur's method of examination with microscope is essential. This is not possible by ordinary rearers and is best carried out by trained men in establishments, known as nurseries. The nurseries grow mulberry and rear healthy stock of worms from which healthy seed is rendered available to the rearers. Nurseries must be located among or at least within easy reach of the rearers. Very wrong ideas prevailed in this respect and it was taken for granted that the nursery could be located anywhere and at any distance. Professor Lefroy even suggested a central nursery for India. My experience has been that the eggs of multivoltine races, which hatch normally in the course of about eight days and are therefore not dormant and are in process of development from the time they are laid, are seriously affected by transit through post. None of the multivoltine and mongrel eggs received from India hatched satisfactorily and frequently whole batches failed. The same has been the experience with eggs transported by post from Maymyo nursery to Toungoo and Prome districts in the Province of Burma itself. Seed cocoons stand the journey better but are not wholly unaffected. If the selection is carried out satisfactorily in the nurseries with reasonable care the rearers expect to get good results for the next two broods and the rearers' rearing need not be actually selected microscopically.

As the worms have to be fed on mulberry leaves, a good deal depends on the quality of these leaves and the profit from sericulture depends on the amount of leaves available from a particular area. The rearers, therefore, must be good growers of mulberry. Mulberry can be grown both as trees and as bush like a field crop. Trees take about eight to ten years to become established before leaves can be got from them. Bushes can be ready in the course of a year. Bushes, however, are more expensive than trees but are necessary in the case of the many brooded worms. Trees do not yield more than two crops of leaves in a year. From bushes with proper cultivation four or five crops of leaves are available. If bushes are supplemented by trees the cost is lessened. Suitable kinds of mulberry are generally available in all places where rearing is carried on. Research, however, is needed for improvement of both the varieties of mulberry and the methods of growing it.

In the skill in nursing the worms I include a knowledge and practice of the sanitary conditions necessary for the well-being of the worms. Given good food and sanitary conditions, satisfactory results are achieved even with unhealthy seed, but in their absence even the healthiest seed fails. Such things can hardly be taught to the rearers through publications. This is possible only through demonstration. The nurseries can perform this function.

Sericulture, *i.e.*, production of cocoons, cannot be a success unless it is carried on as a subsidiary cottage industry and, on the other hand, it is the best subsidiary industry of a farmer. What a farmer can expect by maintaining one acre of bush mulberry and simply by the sale of cocoons will appear from the facts mentioned below. In Bengal, the minimum amount of leaves (with stems as harvested for feeding the worms) from an acre without manure is reported to be about 7,000 lb. and the maximum with manure about 15,000 lb. but it is not mentioned whether with or without irrigation (Bengal Agricultural Department Report for 1924-25). In the poor soil of Maymyo a minimum of about 3,600 lb. and a maximum of about 13,000 lb. have been obtained without irrigation. The yield of leaves varies from soil to soil and according as proper cultivation,

manuring and irrigation or well distributed rainfall are available. It is quite safe to take it that about 30 lb. leaves will be sufficient for worms which will spin 1 lb. green cocoons, although it is common to take this figure at 20 lb. and I frequently get 1 lb. green cocoons with 15 lb. and even less. Taking eight annas as the minimum price of a lb. of green cocoons (the price actually paid for the inferior cocoons in Bengal) with 15,000 lb. leaves about Rs. 250 worth of green cocoons are obtained. As all the leaves may not be utilised in feeding the worms it is safe to take this figure at Rs. 200. In Prome district in Burma with average cultivation, manure and skill in rearing, I calculate that a man can expect about Rs. 150 worth of cocoons from an acre of mulberry with the Maymyo mongrel races of worms. This amount can probably be exceeded in many places. The work of rearing is carried out indoors, is not difficult and is capable of being performed by even old persons and children. The worms require to be fed about three or four or five times during the 24 hours of day and night for a period of three weeks to a month. Provided the mulberry is ready, no other crop brings in such a quick return.

II.—Utilisation.

(1) Reeling.

The first process in the utilisation of the cocoons is unwinding their filaments into usable threads. This is known as reeling. A single filament of a single cocoon is too thin. The filaments of several cocoons are therefore passed together to form one thread and the thickness of the thread depends on the number of filaments thus passed together. The thread thus produced is known as raw-silk. The quality of the raw-silk depends on its uniformity of thickness and continuity. Suppose the filaments of 10 cocoons are being passed to produce a particular kind of raw-silk in demand. The filament of a cocoon varies according to quality and race of the worms from about 200 to 1,000 yards in length and diminishes in thickness gradually from the beginning to the end, the end being about half as thick as the beginning. Therefore in order to maintain the uniformity of thickness care has to be taken to add the filaments of fresh cocoons when some of the ten break off or are exhausted and also to make up for the diminution in thickness of the filaments themselves even if they do not break off. In practice some old and fresh cocoons are always run together. Production of a uniform raw-silk depends on the skill, attention and care of the reeler. This cannot be secured unless reeling is carried on under supervision. Therefore reeling is best carried out as a factory industry. Reeling factories are known as filatures.

The continuous filament is obtained from the middle layers of the cocoon. The external layers consisting of broken strands are unreelable and are usually prepared into tapes, known as *chasam*. The filament becomes too thin at the core which, too, is unreelable. The *chasam* and core and also double, cut, injured and flimsy cocoons form what is known as "silk waste." The waste silk of India is largely exported and spun in spinning mills, into spun silk in Europe, only a part of it being hand-spun in India. Cut cocoons of *tasar* and *muga*, *eri* cocoons and various cocoons of wild silkworms are also exported to be used in spinning mills.

In India a great deal or rather at present the major portion of reeling is carried out as a home industry. The product of home reeling is coarse, has no outside markets and is utilised by hereditary weavers who are used to it for generations. In Bengal the home-reeled raw-silk is known as *khamru*. Even the unreelable outer layers of the cocoons are worked into it and the breakages are not joined. It is therefore a coarse uneven stuff. The weavers have first of all to unwind it, sort it into different grades according to thickness and join the broken ends. Bengal at one time supplied the whole of the Eastern European trade in silk. The East India Company and later the European filatures reeled the silk of this trade in filatures. Still, *khamru* was produced for the Indian market and at present with the closing of the European filatures more of *khamru* is being produced. In Mysore the whole of the raw-silk produced is home-reeled with however a little more care than in Bengal *khamru* and is (or rather was till lately) almost wholly used by Madras weavers. In Assam and Burma the production is small and coarse. A good deal of similarly coarse raw-silk is imported into India and Burma. In Burma the home-reeled silk or similarly coarse imported stuff is used in particular localities. The better class weavers of Amarapura and other places do not

even care to look at it and use imported Chinese silk. This is the case in India too. The Mysore report for 1925-26 says that better reeled imported silk is ousting the Mysore silk. It is certain that the use of all badly reeled silk will disappear in time.

(2) Throwing.

The raw-silk has to be prepared so as to be fit to be woven and the processes through which it has to be taken in this preparation may be summed up in one word "throwing." The thread thus prepared is known as "thrown silk." The hanks are first of all unwound or, as it is called, re-reeled and then the thread is twisted, and doubled and twisted again in the reverse direction like a rope. In these operations the thread has to be transferred from swifts to bobbins, from bobbins to bobbins and from bobbins to reel. In India and Burma all these operations are tediously performed by the weavers themselves with their old-fashioned appliances and, as already stated, the badly reeled silks have to be further sorted into different grades. In Europe and America the processes are carried out by high speed machinery and necessarily the thread which is not uniform or continuous gives trouble by breaking too often and has therefore no chance of being imported into those countries.

The raw-silk in the unthrown condition is used in weaving for only limited purposes.

Any thread which is uniform in thickness and does not break facilitates weaving. This emphasises the necessity of as perfect a reeling as possible. The thrown yarn, being much stronger than raw yarn, is easier to handle in weaving and, being twisted, has no chance of becoming entangled in dyeing. This is why the weavers readily take to it. Thrown yarn is nowadays being imported. At Amarapura the weavers do not like to use any other yarn if they get thrown yarn as they can do more weaving in a given time. Probably this is the case everywhere in India.

(3) Weaving.

Silk is especially suitable for hand-loom weaving. Besides hereditary weavers who are used to handling old-fashioned, badly reeled, rough yarn, there are everywhere educated and influential people who are willing to start or have actually started hand-loom weaving factories. These latter especially are in need of ready prepared yarn. Here in remote Mandalay I get enquiries about suitable yarn required by hand-loom factories in distant places like Shahjahanpur in the United Provinces.

(4) Dyeing.

The yarn is dyed first in pattern weaving or the whole piece may be dyed after being woven. The weavers do the dyeing themselves in most cases, but in some cases the yarn is known to be sent over long distances (from Gauhati in Assam to Belgaum in Bombay) to be dyed. In some places dyed yarn is sold. It is a great advantage to the weavers if they get ready dyed yarn. Besides, there can be an infinite amount of choice in pattern.

Co-ordination of the Entire Industry.

In a properly organised industry the cocoon growers are concerned with the sale of cocoons and are contented if they find a ready sale for their cocoons. The better the cocoons they produce the higher the price they ought to get.

The owners of reeling factories are the people to purchase cocoons and the results are satisfactory if the filatures are located among the rearers themselves and the filature owners deal directly with the rearers. This saves transporting charges and also middlemen. This condition is said to prevail in Japan and the filature owners there are further said to help the rearers to produce better cocoons to their own benefit.

Particular thicknesses of raw-silk are required for particular manufactures and it is necessary for the filature owners to be in touch with the manufacturing industry.

Throwing is best carried out with up-to-date machinery in throwing mills.

Similarly, dyeing is best carried out in dyeing factories.

Weaving too requires to be organised so as to be in close touch with the market.

The industry can flourish only if all these various branches are co-ordinated.

It will also be apparent that production is dependent on utilisation. In Burma attempts are being made to develop sericulture and at present in one township, *viz.*, Leiktho, there are more than 950 rearers. They rear worms and reel their own cocoons into a coarse thread which has a local but no outside market. They rear only as many cocoons as they can reel and the maximum production per rearer in a year is about 3 to 6 lb. of yarn or about 50 to 100 lb. of cocoons. In some districts in Bengal where the rearers can sell their cocoons there are many who produce Rs. 1,000 worth of cocoons and some are said to produce as much as Rs. 3,000 worth of cocoons in a single rearing. Unless arrangements are made for purchasing the cocoons and reeling them in a filature, hardly any further progress can be expected in Leiktho.

Bengal, which at one time supplied raw silk to the world and had an export trade in raw-silk of about one and a half crores of rupees, has now been ousted from the world's market and sericulture has declined in Bengal. On the other hand, the produce of the multivoltine races of India, though not considered suitable by foreign manufacturers for their various manufactures, is quite suitable for the kinds of cloth in demand in India. As a matter of fact much inferior thread is imported from outside and used in India. The Bengal producers are not in touch with the Indian users. This is to a great extent due to the attempts from the time of the East India Company at securing only the raw silk for England. The Bengal producers became adapted to England's manufactures. Silk spinning and weaving have, however, declined in England. The European exporting firms in Bengal have closed down. Unless the Bengal produce is adapted to India's demands the industry is bound to dwindle further if not to die out altogether.

Effect of Bounty, Protection and State Help on Silk Industry.

The following notes are mainly from Rawlley who made a special study of this subject:—

A.—*Bounty and State help in Production or Sericulture.*—France pays bounties on cocoons produced in France and also on reeling carried out of home-grown as well as of imported cocoons. The bounty on cocoons amounts to about Rs. 15 per *maund* of green cocoons which in India will cover probably the cost of production.

France has also made substantial grants for experiments on silk production on scientific lines.

The Ottoman Empire (Regulation 1914) allotted money for free distribution of plants and seed of mulberry, for bounties (Rs. 30 per acre) for the best plantations newly made paid from about the fourth to tenth year and for bounties at Rs. 13-8-0 to Rs. 70 for 30 to 600 square yards of trays of worms reared.

Brazil pays bounties at Rs. 42-8-0 per *maund* of cocoons reared and premiums when a rearer has more than a specified number of mulberry trees.

Austria pays bounties on reeling.

That the Japanese sericulture has grown under the fostering care of the State is well known.

B.—Tariffs and Throwing Industry.—When, under the Codden Treaty 15 per cent duty on French and other continental silk goods was abolished in 1860, the British Industry began to decline. The Parliamentary Report of 1832 on the state of the silk industry clearly stated that the industry enjoyed the greatest prosperity when the import duties were the heaviest.

The throwing industry in America is protected by an *ad valorem* duty of 15 per cent, *plus* a specific duty of about a dollar per lb. The rate of specific duty depends on whether the thrown silk is imported in singles, trams or organ-zines and also whether it is in the gum or degummed. The tariff bar therefore works out to about 30 per cent. The industry has made remarkable progress under this protection, very efficient high speed machinery having been invented and perfected. On account of such machinery it is considered by some that the industry can now be independent of protection.

In Switzerland trams enjoy a small protection.

In France the throwing industry enjoys the greatest protection of all the European countries, *viz.*, 3 francs per kilo of thrown silks.

A high tariff (about 11 francs per kilo) enabled Austria to develop a throwing industry as well as a manufacturing industry.

C.—Tariffs and the Manufacturing Industry.—In order to show what tariffs have done for this industry in some of the countries I quote Rawlley:—

"Briefly speaking, the tariff performs three distinct functions. In the first place it tends to decrease the importation of goods of foreign origin into the protected country, and thereby tends to exclude the foreign competitor from the markets enjoying the benefits of protection. This statement, of course, implies that the import duty is imposed on goods of the same character as are produced by the protected industry or could be profitably produced in the presence of protection. In the second place, the tariff tends to check the export trade of the competing country in those goods which enjoy protection in the home market. The second function is thus intimately related to international competition and trade in silk goods. Lastly, a well-regulated tariff is responsible for the rapidity with which the silk industry develops in a protected country when other factors in production are favourable from an economic point of view.

"The three functions of the tariff, though individually distinct, are interrelated to each other as regards their ultimate effect on the silk industry and trade. This interrelation may be summed up into one leading function of the tariff which offers the protected silk industry opportunities for acquiring the mastery of the home markets and for gradually extending its commercial activities to the external markets. The mastery of the home markets depends, firstly, on the economic production of these goods which are greatly in demand in the home markets, and secondly, on the soundness of the fiscal policy. Success in the foreign markets can be achieved only if the home industry is capable of producing silk goods cheaper than the silk industries of the foreign countries in spite of all commercial barriers. The next two questions which arise out of a consideration of the functions of the tariff are: How far has protection actually succeeded in developing the production of various silk goods in the protected countries and what were its actual effects on the production of those goods in Great Britain? The first question cannot be answered without referring briefly to the development in the production of particular classes of silk goods in the Continental countries and in America and the answer to the second question involves a brief review of the decline in the production of these goods in Great Britain. In order to solve these two questions and to show the practical importance of the tariff, we shall now refer to its effects on the silk-manufacturing industries of those countries which have maintained or even enhanced the interests of their industry by means of protection and also of those which have become independent of foreign supplies of silk goods through the operation of the tariff.

"First of all let us take the French industry into consideration, which, as is well known, is one of the oldest in Europe. It has enjoyed continuous protection ever since 1892. It was a year or two before this period that the Lyons and St. Etienne silk manufacturers began to feel the pressure of foreign competition in goods, such as the pile fabrics of Crefeld, the ribbons of Basel and the taffetas and satins of Zurich. The success of this competition caused great anxiety to the manufacturing interests and led to the adoption of a complicated protective policy in 1892. It cannot be maintained that the policy of protection succeeded in completely stopping the importation of competing goods, but it may be legitimately held that the imposition of a tariff on these goods compensated the French manufacturer for the comparative disadvantage in the higher cost of production, and thus secured for him a stable position in the home markets. This security resulted in the maintenance of production, on a large scale, of velvets, taffetas and other competing goods by the home industry, and thus prevented a possible decline in the exportation of these goods from France. Thus the tariff protected the interests of the French manufacturer not only in the home markets, but in the external markets as well.

"As regards the German silk industry, we have already noted that the protective policy performed a double function. In the pre-War days the German silk manufacturers used to dispose of their surplus goods in

the open British market on account of the protection which they enjoyed at home. The development of the German silk industry and the success of its product in both the home and the external markets were due partly to the fiscal policy adopted by the German Government and partly to the system of combinations, which assisted the silk manufacturers in regulating the prices of goods in those markets to which they had an easy access. Some of the velvet manufacturers went so far as to form a Franco-German 'cartel,' and assisted by the protective policies of the two countries, succeeded in securing a mastery not only of the French and German markets but also of the colonial markets. In the beginning of the War, however, the activities of this combination came to an end. But even apart from the influences of combinations, we may safely assume that the development of the German silk industry was not independent of protection.

"The development of the Swiss silk industry was governed by protection to a much smaller extent than that of either France or Germany. The chief reason for the comparatively less dependence of Switzerland on protection is that the consumption of silk goods in the home market is very small as compared with that in the other silk-manufacturing countries, and therefore it is not necessary to impose heavy duties on the imports of silk goods. The small tariff imposed on goods of foreign origin is sufficient to counteract the influence of foreign competition on the home industry.

"The next two countries whose tariff policy might be considered here are Austria and Russia. During the last decade of the last century the Austrian silk industry made rapid strides, and by the year 1898 the number of power looms had already exceeded 8,000. In 1910 the number of power looms was probably more than 12,000 and that of hand looms about 3,000. The causes of the development of the Austrian silk industry and of the ultimate independence of the Austrian silk market of foreign goods are not very far to seek. In the first place, the heavy import duties of about 11 francs per kilo on velours and of about 5 to 10 francs on other silk fabrics checked the importation of these goods into Austria. In the second place, this marked protective policy induced the British and French silk manufacturers to establish silk mills in Austria in order to avoid the payment of heavy duties. It has been declared more than once by some British manufacturers that British textile machinery and skilled labour played a very predominant part in the elevation of the Austrian silk industry to the position which it had attained by the beginning of the present century. It appears from the accounts of several throwsters and merchants that one of the first effects of the rigorous Austrian tariff policy on the British silk trade was a decline in the exportation of thrown silk to Austria. The advance made by the throwing industry was soon directed towards the establishment of a manufacturing industry, and by the end of the last century Austria was in a position to export velours, dress silks, tie silks and mufflers to British and other markets at low competing prices. In this case therefore the tariff performed three different functions: in the first place, it reflected seriously on the position of the British silk industry and arrested the exportation of thrown silk and manufactured goods from Great Britain to Austria; in the second place, it caused the transference of capital and labour from England to Austria, a process which resulted in the development of the Austrian silk industry to the detriment of the British manufacturing interests: and lastly, the tariff became the means of building up an export trade in silk goods for Austria.

"The Russian tariff policy had also a very disastrous effect on the exportation of thrown silk crepe, and mixed goods from Great Britain to Russia. The heavy import duty, amounting to about 100 per cent *ad valorem*, was simply prohibitive from the point of view of the British manufacturer who could not possibly succeed in his enterprise in a highly protected market. It is needless to deal with the history of the Russian silk industry here, but it is necessary to point out that the Russian tariff policy ultimately made the Russian market independent of British supplies and thereby caused a reduction in the amount of British export trade in silk goods with foreign countries.

"We might now examine briefly the part played by the tariff in the development of the American silk industry. The duty on silk manufactures had been moderate until 1861. In that year it was raised twice, first from 24 per cent to 30 per cent and then to 40 per cent. But towards the close of the civil war in 1864 it was fixed at 60 per cent. It appears

from various investigations that the original object of imposing this heavy *ad valorem* duty was simply to increase the revenue. The increase, maintains Professor Taussig, was solely for revenue, with no trace of that admixture of protectionism which was a factor in so much of the tariff legislation of the period. This high tariff of 60 per cent remained in force until 1883, when the rate was lowered to 50 per cent. Until the year 1897 the general *ad valorem* system of imposing duties on imports prevailed in the United States. Velvets and pile fabrics were, however, an exception to the rule; the duties on these goods had already been made specific in 1890. In 1897 an elaborate and complicated system of specific duties was adopted, and though apparently it was held that the new system was introduced mainly to check fraudulent under-valuation, its actual effect was to raise the previous duties above the point of prohibition. The Tariff Act of 1909 did not touch the specific rates of 1897 but the revision of 1913 resulted in a reversion to the old *ad valorem* system. The rates of these *ad valorem* duties were kept comparatively high, varying from 45 per cent on most fabrics to 50 per cent on velvets and plushes, and to 60 per cent on laces, embroideries and silk trimmings.

"The American silk industry was of a very insignificant size before the commencement of the era of high protection. It is borne out by the course of subsequent development in silk-manufacturing in the United States that the 60 per cent duty of 1864, which was originally designed for emergency revenue purposes, served as an active stimulus to the growth of the American silk industry."

What State help has done in Japan is briefly summarised by Messrs. Howard and Buswell who say (1925):

"If we look at Japan we see the Government supervising the inspection of eggs, testing the raw silk before it leaves Japan, regulating the production of both raw and woven silk so that they will meet the demands of the foreign markets, conducting experiment stations in sericulture and schools of all grades and even acting as the bankers of the industry to assist it in times of depression. As a result of their policy towards this industry we have seen raw silk production rise rapidly until it now forms a large part of the exports of Japan. In the last ten years it has almost doubled. During that period the export of raw silk has risen from less than 200 million yen to about 600 million yen, an amount equal to the total exports of Japan ten years ago. The silk exports are now more than 45 per cent of her total exports. To a large extent this advancement was accomplished by the application of modern methods throughout the industry backed by Government control and supervision.

"Japan has wisely put a great deal of pure science into her silk industry. At her great central experiment station for sericulture she has more than 100 scientists, each an expert in his own subject, and all working on various phases of sericultural and raw silk improvement. As an example of their work we may quote the results of one line of research. In 1914 it required almost 2,200 layings of eggs to produce one *picul* of raw silk. In 1922 they had so improved the cocoons as to size and silk content that less than 1,200 layings were required. The percentage of high grade cocoons over thin ones had also been increased as a result of scientific research and education, until it is now 86 per cent, and it requires only 3.2 units of cocoons to produce one unit of raw silk."

Part II.

Silk Trade of India.

Table I.

The value in rupees of imports of silk, raw and manufactured, for the last five years is given in this table. The figures for the trans-frontier trade of Assam, Bengal, Bihar, United Provinces, the Punjab and Bombay are not available.

The value of imports (by sea) of raw silk averaged Rs. 88,86,000 and Rs. 90,99,225 between 1884—1900 and 1900—1914 respectively. Similar figures for silk manufactures for the same periods were Rs. 1,35,00,000 and Rs. 2,70,00,000 respectively.

Total imports of silk; value in rupees. (Sea-borne Trade of British India for the year ending 31st March 1926.)

By sea.	1921-22.	1922-23.	1923-24.	1924-25.	1925-26.
	RS.	RS.	RS.	RS.	RS.
Raw silk and waste.	1,35,22,974	1,60,32,645	1,21,99,609	1,20,95,248	94,40,040
Silk yarns and manufactures.	2,98,70,549	3,16,54,472	3,40,16,996	3,71,19,455	2,80,29,923
Total ..	4,33,93,523	4,76,87,117	4,62,16,605	4,92,14,703	3,74,69,963
By trans-frontier land route into Burma.*					
Raw silk	65,78,722	76,60,978	93,39,784	1,05,64,607	†1,05,64,607
Silk manufactures.	5,71,430	6,83,467	6,68,218	8,58,630	† 8,58,630
Total ..	5,05,43,675	5,60,31,562	5,62,24,607	6,06,37,940	4,88,93,200

* *Trans-frontier figures for other Provinces are not available.*

† 1925-26 *figures not available but taken as the same for previous year.*

Table II.

The value in rupees of the imports of artificial silk yarn and manufactures is given in this table. The rise has been very rapid in the last three years.

Artificial Silk.

Imports.—(Sea-borne Trade of British India) value in rupees.

——	1921-22.	1922-23.	1923-24.	1924-25.	1925-26.
	RS.	RS.	RS.	RS.	RS
Artificial silk yarn	4,53,772	13,40,318	19,55,453	42,39,979	74,71,820
Piece-goods of cotton and artificial silk.	7,55,726	19,72,692	1,04,08,876	1,76,23,470	1,37,82,502
Other sorts	..	..	..	* 9,31,984	* 6,20,589
Total ..	12,09,498	33,13,010	1,23,64,329	2,27,95,433	2,18,74,911

* *Separately recorded from* 1924-25.

Table III.

Quantities of imports of raw silk and silk yarns, noils and warps are given in this table and those of artificial silk yarns are also given for comparison. The imports in 1909-10 were 2,199,464 lb. and in 1913-14 2,963,139 lb. Therefore the quantities imported are practically constant. In addition to them, there is the big rise in the import of artificial silk yarn.

Mr. C. C. Ghosh]

Imports.—British and Foreign merchandise—Quantity (sea-borne trade).

—	1921-22.	1922-23.	1923-24.	1924-25.	1925-26.
	LB.	LB.	LB.	LB.	LB.
Raw silk	1,607,762	1,828,586	1,365,204	1,413,587	1,325,364
Silk yarn, noils and warps ..	562,458	897,025	967,034	1,524,682	590,797
Trans-frontier import into Burma.*	578,800	567,840	650,400	604,800	† 604,800
Total ..	2,749,020	3,293,451	2,983,638	3,543,069	2,520,961
Artificial silk yarn	70,622	224,916	406,042	1,170,989	2,670,990

* *Trans-frontier figures of other Provinces not available.*

† *Figures for* 1925-26 *not available and same figures as for previous year taken.*

Table IV.

Exports of silk, raw and manufactured, are given in this table, separately for Indian merchandise and British and foreign merchandise.

Indian raw silk exports averaged 1,706,000 lb. (Kashmir *nil*) between 1884-1900 and 1,712,000 lb. (including Kashmir 300,000 lb.) between 1909-14, their average value being Rs. 56,00,000 and Rs. 55,00,000 respectively. About 1867-68 the value was more than Rs. 1,55,00,000. The average value of exports of silk manufactures between 1884-1900 was Rs. 20,25,000 and between 1900-14 Rs. 7,35,000.

Silk.

Total Exports.—(Indian merchandise).

—		1921-22.	1922-23.	1923-24.	1924-25.	1925-26.
Mulberry silk, excluding tasar and other wild silk.						
Raw	Rs.	14,91,565	26,33,780	32,91,279	18,93,592	20,33,681
	lb.	96,025	173,493	190,500	122,989	130,430
Chasam	Rs.	8,00,052	9,28,977	12,99,635	10,27,732	7,59,638
	lb.	661,756	804,194	1,074,238	847,887	671,696
Cocoons	Rs.	45,220	82,042	1,67,117	2,52,765	2,02,045
	lb.	32,704	48,935	96,130	141,805	130,994
Wild silk, tasar, mugari and others.						
Raw	Rs.	90	..	16,500	1,39,600	2,700
	lb.	12	..	801	27,967	1,600
Chasam	Rs.	2,53,299	1,57,980	1,75,302	4,52,664	5,33,505
	lb.	332,697	206,045	227,004	477,950	499,881
Cocoons	Rs.	38,320	14,479	71,559	40,515	42,330
	lb.	27,560	12,299	30,894	27,828	31,730
Total silk (raw) ..	Rs.	26,28,546	38,17,258	50,20,392	38,06,868	35,74,799
	lb.	1,150,754	1,244,966	1,619,567	1,646,426	1,466,331
Manufactures.		RS.	RS.	RS.	RS.	RS.
Goods of silk mixed with other materials.		1,39,921	1,20,916	38,351	95,674	1,99,830
Silk piece-goods		1,53,008	99,249	3,17,227	1,62,162	80,948
Thread for sewing		..	19,430	62,649	17,275	2,200
Other sorts		3,140	3,361	8,827	19,690	18,260
Total silk manufactures ..		2,96,069	2,42,956	4,27,054	2,94,801	3,01,238
Total, silk raw and manufactured (Indian merchandise.)		29,24,615	40,60,214	54,48,446	41,01,669	38,76,037

Export of British and Foreign Merchandise.

——	1921-22.	1922-23.	1923-24.	1924-25.	1925-26.
To British Empire and foreign countries.	RS.	RS.	RS.	RS.	RS.
Raw silk and waste	3,20,974	3,72,119	3,17,634	2,58,693	72,880
Silk yarn and manufactured..	8,92,649	6,38,208	5,57,873	4,91,601	4,37,180
Total (raw and manufactured British and foreign merchandise.	12,13,623	10,10,327	8,75,507	7,50,294	5,10,060

The above tables make clear the insignificance of present exports and immensity of imports. Instead of trying to revive the exports all attempts should be concentrated on production of both raw and manufactured silks in India in order to be able to replace the imports.

Importance of the Silk Industry in India.

Lefroy calculated the total value of silk products, imported and produced in India, at about ten crores of rupees (£7,000,000), omitting items of spun silk; export of manufactured silk and parts of the trans-frontier trade. The trans-frontier trade in the case of Burma alone amounts to more than 1¼ crores. I think the present value will be found to be near about 15 crores of rupees.

According to Lefroy's estimates, the Indian silk industry affects about 1,000,000 persons. According to census figures about 335,000 persons add to their income by rearing silkworms. About 350,000 persons are occupied directly and mainly in reeling and manufacturing. These figures should be very much larger. The census figures may be taken to relate to men and not to include the family. According to Lefroy about three times as many persons are employed as are recorded. The above figures do not take into account dealers and exporters or importers of various kinds of cocoons, raw silk and cloth. The census figures do not distinguish dealers in silk from dealers in other produce. According to the latest figures in Mysore alone about 200,000 families are reported to be concerned in the industry. Probably 2,500,000 to 3,000,000 persons would be near the actual figures for the whole of India.

PART III.

Recent Enquiries into the Industry.

The results of recent enquiries into the position of the silk industry in India are recorded in the following publications:—

1. Report on an Enquiry into the Silk Industry in India, by H. Maxwell Lefroy and E. C. Ansorge—3 vols., 1916.
2. Economics of the Silk Industry, by R. C. Rawlley, 1919.
3. Silk Industry and Trade, by R. C. Rawlley, 1919.
4. Reports on Jute and Silk; Imperial Institute, 1921.
5. Handbook of Sericulture, by N. G. Mukherji (written about 1898).

The Ling Nan Agricultural College Agricultural Bulletin No. 12 on "A Survey of the Silk Industry of South China" (1925) by C. W. Howard and K. P. Buswell is of especial interest to the Indian Silk Industry. The sericultural industry of South China which supplies about 15 per cent of the world's raw silk (Canton silk), is carried on with multivoltine worms as in the case of the whole of India excluding Kashmir and the Punjab. The worms in South China are not superior to the inferior races of Bengal, but better organisation and better reeling enable the produce of these inferior worms to find a place even in the highly exacting American spinning and weaving industry. In South China there is a division of labour even in sericulture proper, there being mulberry growers, seed rearers and cocoon rearers. Mulberry alone is grown by some people in Bengal for sale but not on such an organised scale.

The enquirers into the Indian industry whose reports are mentioned above considered the question from different view points. The Imperial Institute and Rawlley (Mukherji too to a great extent) wanted raw materials, *viz.*, raw silk for the weaving or sewing-thread industry and silk waste and wild cocoons for the spinning mills. Lefroy and Ansorge considered the industry as a whole and their report is the most important of all. The question of the development of the sericultural industry leads one into a consideration of the industry which utilises the product of sericulture, as without utilisation no sericulture can flourish. Export of raw silk and waste is no doubt an opening, but in foreign countries the raw silk produced from the naturally inferior Indian cocoons has to compete with the produce of other countries enjoying the advantage of naturally superior cocoons and superior organisation backed by Government. The best plan is to adapt the Indian sericultural industry to the requirements of the Indian market.

The data and recommendations in the above publications are briefly discussed below and my opinion is added within brackets.

A.—Existing areas of production.

The Bengal Industry.—As already stated it was the production of Bengal which fed the European trade at one time. The recommendations (except in the report of Lefroy and Ansorge) are mainly directed towards reviving this declining or rather extinct trade.

According to Mukherji the decline of Bengal sericulture was partly due to the entry into the field of China and Japan, but what affected the Bengal industry most adversely was the protection and subsidy accorded to the industry in other countries. Thus in 1812 France spent about Rs. 20 lakhs in subsidising cocoon rearers and about Rs. 19 lakhs in rewards and bonuses to reelers and in order to encourage the throwsting industry imposed a duty of 3 francs per kilo on imported piece-goods. The industry also received indirect help through subsidies paid to steamer companies engaged in commerce. Similar methods were followed in Italy and Japan (and also probably China). The decline of the English silk-manufacturing industry to which the Bengal sericultural industry had become adapted, was another cause. The high cost of labour in England being the principal cause of this decline (according to Mukherji but probably the removal of the import duty had more to do with it) he suggested that there was only one means of England being able to combat successfully with the continental silk trade, *viz.*, by transporting the centres of competition from Manchester, Birmingham and Leeds to Baluchar, Mirzapur, Benares, Amritsar and Srinagar.

Lefroy attributed the decline of the Bengal sericultural industry to the following causes, *viz.*:—

(1) Lower price. The ravages of pebrine disease in Europe were most felt between 1855 and 1865 when the European industry was practically ruined. The export from Bengal was at its height in 1867-68 and about this time the price paid for Bengal raw silk was the highest on record since 1855 to the pre-War period, *viz.*, about Rs. 25 per *seer* (2 lb.). The price ranged from Rs. 12 to 17 between 1908 and 1915. As the great part of export was in the hands of a few firms in Calcutta, the fact that they were offering low prices for cocoons based on their contract for raw silk would very greatly check production for export. Japan put forth her whole energy into sericulture at this time. Immense quantities of eggs were produced in Europe, the Levant and Persia. From this time the demand for Bengal silk was for special purposes only.

(2) High rents of mulberry lands, about Rs. 36, 42 and 48 per acre.

(3) Diseases.

(4) Withdrawal of European firms which bought cocoons, reeled them in filatures and exported the raw silk and waste.

(5) Antiquated methods. In France, Italy and Japan by research and experiments races of worms have been improved, superior methods of rearing have been introduced and reeling processes have been perfected through improved machinery.

(6) Rise in price of rice and other crops. [In the case of a subsidiary industry probably this is not quite correct.]

(7) Rise in wages, while the reeler and rearer are unable to earn more. [This is also probably not quite correct. Rearing is a subsidiary industry.

Actually there has been a rise in the wages of the reeler. Certainly much higher wages are paid in Italy and France, though probably that is not the case in Japan and China.]

Lefroy does not believe that the Bengal worms have actually degenerated. [The fact remains however that these worms are of inferior and degenerated type.]

[In addition to the above I think the following two causes were also operating:—

(1) Absence of direct dealings between the rearers and reelers. The middlemen absorb the major portion of the profits which should really belong to the rearers. If the reeling concerns act in close co-operation with the rearers both are benefited. This system prevails in Japan.

(2) The unscientific method of purchasing cocoons by number principally. The rearer's aim is to produce as many cocoons as possible without any regard for quality. This leads to degeneration of the cocoons. A scientific system of testing the cocoons before purchase should be adopted so that a rearer producing superior cocoons may get a higher price for quality.]

For ameliorating the Bengal industry Mukherji suggested—

(1) Teaching of up-to-date methods of sericulture in schools. [Demonstration in nurseries is probably more effective.]

(2) Growing of tree mulberry in order to lessen the cost of production [Is possible partly.]

(3) Checking of disease by Pasteur's method. Mukherji was mainly responsible for starting silk nurseries in Bengal.

(4) In order to be able to compete with Chinese and Japanese filature reeled silk—

(*a*) Introduction of European cocoons [discussed in my introductory note—not practicable];

(*b*) Improved reeling with improved machinery; and

(*c*) Export of re-wound and thrown silk. [This last was the most helpful suggestion and if adopted the export trade of Bengal would not have declined. As already stated Southern China produces a cocoon not superior to the Bengal cocoons and the export trade of Canton silk has been maintained by sending out raw silk in a re-wound or re-reeled condition. The filatures there have set up re-reeling machinery. Their reeling machinery is practically of the simple Bengal type with slight improvements.]

(5) Organisation of the weavers so that (*a*) they might obtain proper value of their products and be free from the clutches of moneylenders and middlemen, and (*b*) their goods might be properly advertised.

(6) Formation of an association by both Europeans and Indians and with representatives of all branches of the silk industry and having a journal in the vernacular.

Lefroy suggested—

(1) Introduction and production of superior races of worms by mongrelisation. [He mentioned the Madagascar race and Cleghorn's hybrid. The former was a multivoltine race evolved out of European univoltine but is no longer in existence in India. The question of races has already been discussed.]

(2) A hill amelioration station. [Ameliorating silk worms by rearing them in hills, that is, in a cold place, is a debatable point. I have been carrying on experiments both at Maymyo (elevation about 4,000 feet) and Mandalay (elevation about 250 feet). If the conditions are to be judged by the health of the worms and quality of cocoons they produce, both these places have certain periods in the year when the conditions should be considered as equally suitable. Again the cold weather at Maymyo is almost equally as disastrous as the hot weather at Mandalay.]

(3) Organisation of better reeling and disposal of raw silk so as to displace the imported stuff.

(4) Arrangement for the supply of disease-free seed.

(5) Improvement of mulberry.

(6) An organiser who will not simply confine his ideas to the issue of disease-free seed but try to organise the industry as a whole. [This last was the most useful and urgently needed suggestion. At present the Bengal Sericultural Department is hardly doing anything more than issuing the so-called disease-free seed of the two existing degenerate races of worms. The closing of the European filatures will be very harmful for reeling. Out of all the existing silk-producing areas in India excepting Kashmir, the reeling carried out in filatures in Bengal is superior. Closing of the European filatures will lead to greater production of the home-reeled inferior *khamru* silk and in the course of about a generation the art of superior reeling will disappear. This will be a serious loss. *Khamru* silk has still a market but it is bound to disappear in competition with better reeled and more easily workable imported yarn. The first duty of this officer should be to arrange for reeling and throwing so as to take the place of the imported yarn. By proper reeling and throwing there is no demand of any quality which cannot be met either in or outside India.]

The Mysore Industry.—The previous history of the sericultural industry in Mysore, at present the largest multivoltine silkworm-rearing tract in India, is not so well known as that of the Bengal industry. The Mysore State has been doing for the last ten years all that is necessary for this industry which (up till now) enjoys the unique advantage of a market close at hand to which it is at present adapted. With regard to this industry Lefroy's recommendations were—

(1) Organisation of seed supply.

(2) Improvement of the Mysore race of worm by mongrelisation or trial of a better race. In this connection he emphasised that univoltine races were never to be thought of.

(3) Improvement of reeling and silk waste. [Improved reeling will yield improved waste. The Mysore department has set up a filature. But attempts should be made to replace the entire home reeling by filature reeling. The Mysore Sericultural Department is trying to introduce a home-reeling basin. It is not expected to serve the purpose. As already mentioned, the better reeled and easily workable imported yarn has begun to oust home-reeled Mysore silk. Their best plan is to arrange for turning out a yarn of the same quality as the imported yarn.]

(4) Improvement of mulberry.

(5) Organisation for disposing of the produce in India. [Lefroy's suggestion proved prophetic in this respect. The Mysore Government filature has now been compelled by experience to turn to the Indian market.]

Madras.—The Kollegal tract of the Madras Presidency is really a part of the Mysore plateau and attempts at improvement in co-operation with Mysore were recommended by Lefroy.

Assam.—The small industry in Assam had been previously investigated by Rai Bahadur B. C. Basu and his recommendations were endorsed by Lefroy. A small sericultural department has since been organised in Assam.

Burma.—Burma, which was not considered by Lefroy to be promising, has now organised a small sericultural department which has been working with a definite programme of—

(1) Research in the methods of growing mulberry both in the hills and plains.

(2) Research for producing superior kinds of multivoltine worms, the results being already apparent in the Maymo mongrel races.

(3) Organisation of rearing by the farmers and hill tribes, three nurseries being already started for seed supply.

(4) Organisation of reeling and throwing and, later, of dyeing.

Kashmir, Jammu and the Punjab.—The other existing rearing tracts, *viz.*, Kashmir, Jammu and the Punjab, have somewhat different problems. They rear univoltine worms and work with tree mulberries. Kashmir and Jammu have well-organised sericultural departments. The problem of the Punjab is again different from that of Kashmir and Jammu. Owing to organisation and pressure, under practically similar conditons, Lefroy found that the Jammu industry had grown seven times as much as in the Punjab,

although the Jammu rearers got about Rs. 15 and the Punjab rearers about Rs. 30 for each *maund* of cocoons produced. For the Punjab Lefroy recommended—

(1) Planting of more mulberry trees.

(2) Hibernation of seed and its supply.

(3) Adjustment of the price of cocoons, as although superior they were selling practically at the same price as Bengal cocoons.

[I am not aware if the Punjab has made any greater progress beyond helping cocoon production. The real problem here is the absence of a reeling factory. These cocoons will admit of a filature with up-to-date machinery being started which should purchase the cocoons and pay a proper price for them. Lefroy found much of the cocoons finding their way to Bengal. The raw silk will find a market anywhere in India, Europe or America. The Punjab itself uses large quantities of foreign stuff, both raw and manufactured. But it would be a mistake if profits are compared with, and judged according to, Kashmir standard. Owing to the peculiar monopolistic conditions cocoons are produced so cheaply in Kashmir and Jammu that the State finds it more profitable to sell cocoons to Italy and France than reel them. Although Lefroy suggested, for the Punjab, organisation of reeling and disposal of silk, he thought the industry was too small to justify appointment of an expert and supposed that this duty could be performed by the Silk Institute he proposed. A reeling factory is likely to stimulate production.]

B.—New Areas of Production.

Lefroy discussed the controlling factors of development in new areas *viz.*, (1) religious belief creating an aversion to taking life, (2) suitability of climate, (3) soil allowing of bush cultivation without irrigation or otherwise, (4) competing crops, such as jute, rice, sugarcane and (5) pressure of population; and his opinion was as follows as regards possible fresh areas of production:—

Hardly promising.—Burma, Gujarat and Madras East and further extension in Bengal.

Promising.—Khasi Hills; Orissa and Madras East Coast (November to March very promising); Bihar and United Provinces East (very promising); United Provinces West, Punjab East, North-West dry area and Baluchistan (one spring crop); Rajputana East and Central India West (three rainy months and spring); Kathiawar (for six months); Malabar and the Konkan (a small industry in the south); Chota Nagpur plateau. About the suitability for mulberry silk of the *tasar* growing tract (Chota Nagpur, Central Provinces and Central India East), he thought experiments only could decide.

Apart from isolated districts practically everywhere, he thought the following large tracts suitable, *viz.*, the Punjab submontane districts extending to the east; Tirhoot extending over the United Provinces submontane tract to the Punjab on the west and stretching east to the Bengal jute districts; Chota Nagpur plateau; Orissa; Khasi Hill plateau and Central India Uplands.

C.—Lines of Development of Production.

Regarding lines of development he recorded—

(1) that it is essential that the development of silk production should be associated with the commercial organisation of silk utilisation and the two branches must be in the same hands;

(2) that there is very great need of a real expert to give proper advice to landlords and influential persons who wish to develop sericulture or other branches of the silk industry;

(3) that it is a mistake to try to develop sericulture by teaching it in primary schools; it is certainly of value as a nature study but conveys no idea of its economic possibilities and as a matter of fact playing with silkworms may be a bar to sericulture;

(4) that indiscriminate distribution of seed should be avoided; otherwise failure through ignorance is interpreted as one through unsuitability of the industry;

(5) that sericulture cannot be developed through publications;

(6) that the only way of development is through actual demonstration among the prospective rearers.

[To all of the above I fully agree.]

D.—Enquiry into the Manufacturing Industry.

In his enquiry into the utilising or manufacturing industry Lefroy found—

(1) That if the producers and manufacturers could be brought into touch, much of the imported thread could be replaced by the produce of the country, and as a matter of fact, much thread much inferior to what was available in the country was imported and used.

(2) That the weavers themselves carried out the preparatory processes in their slow, tedious and wasteful methods, the time taken to produce the cloth was necessarily long, the cost heavy and the wages earned by the weavers small. He suggested the introduction of certain preparation machinery devised and made in India.

[The recommendations regarding these machinery will be of no avail. I was closely connected with, or rather mainly responsible for, one of them, the Pusa automatic twister and doubler, which was adapted from the Pusa continuous spinning machine patented by me. I know the working of the others and in Burma I made an improved one. I must say that none is economical in use; I am convinced that it is rather late in the day to try to devise such machinery and the wisest plan is to adopt the high-speed machinery already invented and in use in America and other countries.]

(3) That commercial organisation was urgently necessary both for the internal and export trade of finished cloth. As regards the internal trade the manufacturers of one place were not acquainted with the demands of other places. If the demand and supply in the country could be brought into communication much unemployment could be removed and foreign supply replaced by home produce. For this purpose the first necessity was the knowledge of production, demand and foreign supply and the next step an organisation which could arrange for supplying any particular standard in large quantities, and of course this would be best done on a co-operative basis.

As regards the export trade he suggested that it would be necessary to send out men with Indian productions for canvassing their sale and these men at the same time could study the demand in those countries. At present some of India's beautiful hand-loom products are sold in big cities in Europe and America at exorbitant prices, the major portion being the middlemen's profits. This is doing harm to India.

As regards methods of organisation he suggested—

(1) Survey of production.

(2) Survey of demand.

(3) Advertisement.

(4) Experimental production of cloth in demand in foreign countries and of foreign cloth sold in India with a view to organising its production in India.

(5) Exhibitions and diplomas.

(6) Schools only when there are weavers to attend and when it is possible to teach them to make a class of fabric for which there is a demand.

(7) Organisation of finishing.

(8) Direct demonstration when there is a new process to be introduced.

(9) Organisation of weavers co-operatively.

Lefroy sums up practically all his recommendations in the enumeration of the activities of the Silk Institute he proposed. They are quoted fully below with my opinions within brackets:—

The activities of the Institute to include the following main branches:—

"1. The cultivation of all varieties of silkworms of India, and of races from abroad, as a seed supply centre and for the trial of new races; the production of new races by hybridisation, the amelioration of existing races by selection and good cultivation; the issue of hibernated seed or of all varieties of seed required, including the Bengal races, the Assam races, the Mysore, the Madagascar, the French, and also the *eri*,

"Artificial cold storage will be required; a model 'village rearers' settlement' will be required for training men and for providing trained men for demonstration. There must be trained men available. The cultivation of mulberry, the varieties of mulberry must be studied and cuttings or seed provided of the best varieties. The problems of hibernation of seed, of the supply of seed produced in India and of artificially hibernated seed for hatching in October will come under this section."

[It is a very comprehensive item. As already indicated I would omit *eri*. Univoltine races will have to be dealt with for mongrelisation work and for new one-brood rearing areas. It will be a failure as a regular seed-supplying centre for many-brooded races for reasons already given in my introductory note. Its function should be—(1) research for producing new improved races of multivoltine mulberry silkworms; (2) research with one-brooded races, and (3) research with mulberry. There should be arrangement for rearing all races under trial on a scale such as a small rearer would adopt and trials should include (*a*) leaf consumption, (*b*) silk content of cocoons, (*c*) reeling quality of cocoons, (*d*) quality of filament, (*e*) testing of raw silk produced.]

"2. The processes of reeling, re-reeling, twisting, doubling, warping to be practised, tested and improved. New machines to be devised or tested, trained mechanics to be available to demonstrate better processes. Model re-reeling, twisting, warping factories to be established."

[It would be necessary to have reeling and re-reeling arrangements with up-to-date machinery and also a small model throwing mill with up-to-date machinery. A trained mechanic should be necessary. His training and function I detail in my conclusion.]

"3. The trade in raw silk, new openings for Indian silk, the method of making *chasam* and improved waste, the testing of raw silk, the trade in imported raw silk, the trade in *chasam* and spun silk to be dealt with and studied, also the trade in *muga eri* and *tasar* yarns, waste and cocoons."

[Improved reeling will produce improved waste. For the present testing of raw silk will be carried out under item 1 for experimental purposes. If it is to be carried out for commercial purposes it falls within the sphere of a conditioning house.]

"4. Dyeing to be practised, studied and improved, including indigenous dyes and artificial dyes. A dyeing expert to be available for demonstration and for advising on model dyeing houses. A model dyeing house to be worked for show."

"5. Designing, including the collection of fabrics, designs, etc., and the preparation of new designs, colour schemes, etc."

"6. Weaving, the preparation of all fabrics possible in silk, to be practised, improved and taught. A special establishment to be maintained of the most expert weavers for the preservation of methods liable to be lost."

"7. The best processes of cleaning, sponging, polishing, calendering and packing silk fabrics to be studied and developed. A model finishing factory to be established."

[5, 6 & 7.—Probably not necessary, at least at the beginning. The existing provincial weaving schools can be utilised—see conclusion.]

"8. The cloths made and sold in India, imported cloths and fabrics of all sorts, to be collected, and their possibilities investigated. The trade in silk fabrics, the possible demand, new markets, new fabrics, to be studied. This is to be separately dealt with for the European and the Indian trade."

"9. Questions concerning foreign tariffs and bounties, legislation in India, and the development of co-operative credit to be dealt with and watched."

"10. Wild silks, including *muga* and *tasar*, to be studied. *Eri* cultivation and its development to be studied."

[I would leave this out.]

In the original scheme Lefroy was to extend his enquiry into China and Japan but could not do it and he suggested that this enquiry should be carried out before any development was commenced.

Mr. E. C. Ansorge, I.C.S., was associated with Professor Lefroy to investigate the silk trade and the results of his enquiry forms Vol. II

of the reports. Both necessarily overlapped each other to a certain extent. I quote Ansorge's summary in full:—

"1. There has been a very great decline in exports of Bengal raw silk to foreign countries. The place of this silk has been partially taken by exports from Kashmir, but these are small in comparison with the Bengal exports of earlier years. There has also been a marked decrease in the use of Bengal silk in India, though this is neither entirely, nor even largely, due to any demerit of the silk itself, but rather to the decline in production in that Province. Were Bengal and Mysore silk produced in greater quantity, and especially could it be produced at a cheaper rate, there are numerous markets ready to take it. The first point is therefore to find a method of increasing, and if possible cheapening, the production of Indian raw silk.

"2. The weaving industry is on the whole in a fairly flourishing condition, but the place of Indian silk has been largely taken by a heavy increase in the amount of foreign raw silk imported into this country. In some cases such silk is chosen in preference to the Indian material on the ground that it is more suitable on account of finer reeling or some other cause—for the purpose for which it is required. More often, however, it is used because it is obtainable more easily or at a cheaper rate. To supply the former demand some changes are necessary in the present methods obtaining in this country: to supply the latter nothing is needed but greater production and cheapening of the cost.

"3. There is a marked absence of organisation in the silk trade as it is at present carried on, and a corresponding success on the part of better organised competitors in the Indian markets. The methods according to which the weaving industry is conducted is wasteful and unsatisfactory. Illustrations of this will be found throughout this report. The introduction of modern methods has met with considerable success in the Madras Presidency, but there are many areas where no serious attempt at such improvements has been made. Where these improvements have been attempted, they are frequently retarded by the small merchant-employers—the very persons who under the present conditions would profit by the change. The condition of the weaving community is generally very unsatisfactory, as has already been shown. Some system of profit-sharing or co-operation is badly needed for its improvement. In Lyons and St. Etienne in France benevolent societies exist for the purpose of advancing sums to small master-weavers for modernising their plant, etc. These societies were approved and supported by the French Government in 1909. In Japan there is a sericultural association, established in 1892, said to contain some 150,000 members. This association has among its objects those of creating a larger market for Japanese raw silk, making investigations and researches regarding sericulture, and attempting to develop sericulture on a co-operative basis. Other bodies exist for the purpose of improving existing methods, and sericultural guilds have been formed with the object of removing defects in the practical management of the industry. It is said that silk-rearers are so combined by Government regulations. There are also co-operative societies of all kinds, for advancing funds, for finishing and selling the produce of members, and for purchasing material or plant. Such societies are said to number five thousand—or one for every two villages,—of which three-fifths are concerned with sericulture, and they are reported to be entitled to concessions of various kinds from Government. That there are many difficulties in the way of organising production on these lines in this country cannot be denied, but better organisation of the industry (on these or on other more suitable lines) is an urgent necessity in this country. A commercial agency for the purpose of discovering the right markets and for the disposal of the produce would fill a much needed gap in the present method of carrying on the industry.

"4. There has been a startling decrease in the export of silk manufactures from this country, and a still greater increase in the import of foreign manufactured goods. The use of the latter is most marked in the Punjab: The consumption of Japanese spun silk is particularly noticeable in that Province. It is possible that the Punjab is now passing through a stage which the Madras Presidency reached more rapidly, when the advantages of such silk were realised, but not its disadvantages. After a short trial that Presidency largely rejected such silk for ordinary manufactures, and the weaving-masters of the Punjab may yet do the same. The import of foreign piece-goods into that Province, however, undoubtedly supplies a real demand, which at present the Indian looms are not able

to meet. The heavy Indian silk manufactures are now commonly rejected there in favour of the finely-woven and bright-coloured Japanese article. Very little attempt has been made in India to meet this demand. Even where, as in Madras, the Indian manufactures are generally preferred, there is still a market for printed and embroidered Japanese goods, and these could only be supplied by mills specially fitted for their production. How the Punjab market might be courted on behalf of Indian manufactures of the better quality must remain to be seen, but finer weaving, better finish, and above all a careful study of the exact nature of the demand, are indispensable preliminaries to any such attempt.

"In conclusion, the possibilities of the silk trade in India are still very great, and the present moment is eminently favourable for their development. The wide range of mixed goods previously imported from enemy countries bears witness to the demand for such goods in India, and with proper organisation it should certainly not be impossible to supply most, if not all, of these goods at home. Further, if satisfactory methods can be found for checking the decrease in the production of silk in this country, there does not appear to be anything to prevent the substitution of Indian for foreign raw material upon the looms, for the manufacture of these and other articles. Finely-reeled silk of the best quality is not at all required for the purpose of manufacturing cheap mixed goods of the nature referred to above, and there is no reason why Indian material should not be used. If by increasing and cheapening the production of raw silk in India and by organising the silk-weaving industry so as to enable it to compete successfully with the weaving of other countries, the demand for silk manufactures in this country could be supplied from this country's looms, there would then be no cause for regret even if the European market for Indian raw silk were never recovered."

[It will be observed that Lefroy concluded that the low price of the raw silk was one of the principal causes of the decline of the Bengal sericultural industry. Ansorge wants to cheapen the price further. The real solution lies in better races of worms which will produce more silk in the cocoons and better methods of rearing which will prevent loss of one rearing out of every three attempted.]

E.—Bounty Protection and State Help.

Lefroy concluded that any system of bounty for production would be impracticable under existing conditions for the whole of India and it would be better if the money could be invested in a department which supplied expert advice and which could aid experimental cultivation with grants suited to the conditions of each tract. [I agree with him and would further arrange for competitive rewards and prizes.]

As regards the manufacturing industry Lefroy apparently did not have the opportunity of studying this question and was not in possession of facts which have now been brought together by Rawlley. His opinion is quoted in full below:—

"There are really four classes of imports! raw silk to be used in India, of a quality not now produced: spun silk, which is imported chiefly because the Indian manufacturer does not produce so cheaply: mill cloths, of silk or silk and artificial silk, of a kind beyond the scope of the hand-loom weaver: hand-loom or mill cloths of a kind that could be made in India but which are imported on account of better finish, better packing and better business methods.

A high import duty on raw silk would hit the weaver in India very hard: he would turn to Indian raw silk: if he can now use Indian raw silk, he can be persuaded to do so by commercial organisation better than by a high duty: and if Indian raw silk cannot be produced so cheaply as Chinese, it seems a pity not to let the Indian weaver benefit by the cheap silk offered by China.

Regarding spun-silk, it has to be ascertained why Indian mills cannot produce spun-silk at the price Japan and Italy can: the two mills in Bombay make spun-silk and use it themselves: but they cannot sell at the price the Japanese do in spite of the 7½ per cent duty. Why this is so is not known and only enquiry in Japan and Italy can clear this up. A high duty on the figured silks so largely imported from Japan would help the mills: but here again, one wants to know why the mills are undersold by Japan. If the industry in Japan receives help from the State which

is equivalent to a bounty, then a corresponding bounty should be given in India or a protective tariff equal to the bounty. The matter cannot be decided without further enquiry.

Lastly, a duty on the plain silks and fabrics that can be made in India would directly benefit the Indian weaver as his production would be in greater demand: but here again, it seems likely that the weaver in India would benefit more by being organised and aided, rather than being assisted by a tariff. Higher price for Indian silk does not necessarily mean more silk sold or better wages for the weaver; it probably means more profit for the dealer and more dealers, and the industry is so broken up and scattered that it would probably not benefit by a tariff to any very great extent. Personally I am convinced that only organisation will help the weaver and not any tariff."

F.—Legislation.

Legislation is principally resorted to in order to check diseases of silkworms by prohibiting use of unexamined seed and rearing of diseased worms. Lefroy discussed this question and concluded that legislation is not practicable under the existing conditions in India. I fully agree with him.

Lefroy, however, thought very strongly that regulation of sale of fabrics was necessary, as a good deal is sold under the name of silk which is not silk but a mixture of cotton or artificial silk or some other substitute. He suggested stamping, subject to penalty for false description, and thought that his proposed Silk Institute in its department of trade organisation would be of help in this matter.

The real point is the competition of artificial silk or rayon with the natural silk. The Mysore report for 1925-26 definitely says that rayon is competing with natural silk and the same thing was said in the Legislative Assembly by Mr. K. C. Neogyi as regards Bengal in the course of the debate on the Bill for reducing the import duty on rayon. In Burma too weavers are weaving rayon. My personal opinion is that rayon will really be a competitor for cotton especially when its price is cheapened. The danger lies in purchasing artificial silk fabrics in the belief that they are getting a cheap real silk. Those who want silk will not purchase rayon if they know what rayon is.

The duty is stated to be reduced for the benefit of hand-loom weavers. Here the urgent necessity is to make a ready prepared silk yarn available which can be woven at once. The wages to be earned by weaving a cheap artificial silk cloth will certainly be less than those for real silk cloth.

Rawlley makes suggestions for the development of *tasar*, *eri* and *muga* and for improving reeling and waste. These have already been discussed. He recommends a conditioning house at once, to which I do not agree. A conditioning house is more necesasry for the export than the import trade. The manufacturers are practically wholly weavers who have no advanced ideas and it will be several years before a conditioning house is called for.

The recommendations of the Silk Committee of the Imperial Institute are quoted below in full:—

"*As regards Economic and Industrial Questions.*—1. The development of the Indian silk industry and especially of the export trade, is dependent upon its being adequately financed by a responsible body receiving Government support, and upon European supervision of the industry.

"2. Indian silk encounters, and will continue to encounter the competition of increasing supplies of the fine quality silk from the Far East, notably Japan. The Committee are of the opinion that the enhanced value of Indian silk that would result from a radical improvement in its quality and standard of reeling should render it possible for the Indian product to compete successfully with Japanese and Chinese silks.

"It is of the utmost importance to increase the production of a good class of raw silk in India, and to reduce to a minimum the production of inferior grades.

"3. Modern filatures, controlled by European directors and assisted by the Government, should be established in the chief silk districts. These filatures would regulate the methods of production, purchase the cocoons, and grade the silk before export. They would also reel the small quantities of silk produced in other parts of India.

"4. Silk conditioning houses, on the lines of that at Lyons, should be established, and all raw silk should be officially examined and marked at a conditioning house before leaving India.

"5. The Kashmir and Patiala silks, if lightly improved in uniformity of size, in cleanliness and nerve (Kashmir silk) should find a ready market in this country. The Kashmir industry should be advised to increase the production of 13—15 to 18—20 deniers in order to develop further consumption of Kashmir silk in the English market. Coarser sizes, however, could be introduced with advantage to meet the needs of certain branches of the trade.

"6. Large quantities of Bengal silk, if available, could be utilised for certain sections of the industry in this country, though an improvement in the quality is desirable. With improved reeling, and satisfactory prices, there would be a possibility of re-establishing this class of silk in its former position in other branches of the trade.

"7. *Waste silk.*—

(*a*) The present objections to Indian waste silk in this country would be removed if adequate improvement were effected in regard to cleaning, grading and packing the material before shipment.

(*b*) Degumming of the waste should be carried out in this country.

(*c*) Kashmir knubs and waste could be used in larger quantities in this country if supplies were available.

"8. *Wild silk.*—

(*a*) Of Indian wild silk *eri* is the most likely to find an established position in this country, and if feasible the production of cocoons for export should be encouraged. It is essential, however, that steps should be taken by the Government of India to ensure that the bales exported contain clean, pierced cocoons almost exclusively. Further, if feasible commercially, the cocoons should be exported in the reversed condition.

(*b*) A consignment of *muga* silk should be sent to the Committee for practical trial if the silk can be obtained at a price not exceeding that of *eri* silk.

"9. *As regards Sericultural Questions.*—

The establishment, by the Government of India, of a central sericultural institute is a necessity. The functions of the institute should include—

(*a*) The training of men to develop sericulture in India.

(*b*) The supply of disease-free seed of approved native and foreign races of worms.

(*c*) The testing of new races and the production of hybrid races.

(*d*) The investigation of silkworm and mulberry diseases.

(*e*) The study and demonstration of modern reeling and re-reeling processes with a view to their adoption in India.

"10. The establishment of smaller institutions in all important sericultural districts.

"11. If foreign seed is imported into India, white races should be selected, if possible."

I have already given my views that *eri*, *tasar* and *muga* are at present best left as they are and that improved reeling will produce improved waste. One noteworthy suggestion for reducing inferior grades of raw silk is echoed by Messrs. Howard and Buswell who want to abolish home reeling altogether in South China.

PART IV.—*Conclusion.*

I merely note here what I consider to be urgently necessary to make a beginning with a view to helping the silk industry.

1. Serious attempts should be made to organise each of the following as separate industries, *viz.*:—

(1) Production or rearing of cocoons.

(2) Reeling.

(3) Throwing.

(4) Dyeing and printing.

(5) Weaving.

2. A Central Agency is urgently required to study and co-ordinate the whole industry and trade in India and Burma. It may be a silk institute or simply a department like that of an Imperial Specialist, say as Imperial Sericulturist. He should have facilities—

(i) For research work in connection with sericulture for (*a*) univoltine races and for (*b*) mongrelisation with the aim of obtaining superior multivoltine races. For this purpose he will require a station at a place where high temperature, frost, cold and continuous rain will not interfere with rearing, if it is possible to find such a place. If not it will be necessary to have a supplementary station in order to avoid these drawbacks.

He should have (1) a small reeling factory for experiments with arrangements for re-reeling, (2) small model throwing factory and (3) also a small dyeing factory. He will thus be able to advise as to the best method of reeling, re-reeling, throwing and dyeing and an account of his surveys (referred to below) will be best able to place the reeling, throwing and dyeing factories in touch with weavers or weaving concerns.

(ii) For survey of raw materials by collection of raw silk and yarn in use all over the country with details as to (*a*) purpose for which used, (*b*) source, imported or locally produced, actual place of production, (*c*) quality (to be tested) and price, (*d*) amount of consumption, (*e*) details as to processes to be undergone before being woven.

This survey will include *eri*, *tasar* and *muga*.

(iii) For survey of demand in the market by collection of all kinds of woven stuff in use with similar information as regards (*a*) purpose for which used, (*b*) source, imported or locally produced, actual place of production, (*c*) quality and price, (*d*) amount of consumption, (*e*) complete analysis of each to find out pattern, dye, weave and yarn so that weavers can be at once shown or told how to produce it, with arrangement for the supply of necessary yarn. If any particular kind of yarn is required reelers and throwsters can be advised accordingly. This survey will include *eri*, *tasar* and *muga*.

3. He need have no weaving department and it will certainly be economical if he works in co-operation with the various weaving and technical institutes now in existence in many Provinces. At least a weaving department is not a necessity just at the beginning. If this arrangement does not work it can be thought of later on. If they are to serve their purpose these provincial weaving institutes ought to be able to undertake propaganda on the following lines:—

When a particular kind of cloth is in demand, its manufacture has to be demonstrated to the weavers or a co-operative society of weavers who can be shown that either the cloth can be produced in their own loom as it is or with some additions or alterations, or the loom by which it can be produced has to be taken to them and its work demonstrated. At the same time the Imperial Sericulturist will, on account of his above surveys, be in a position to supply information as to where the particular yarn is available and where the cloth can be sold.

He should have staff for all the above work. The only members of the staff who will require training outside will be a sericultural mechanic and a dyeing and printing expert.

The functions of the sericultural mechanic will be the following:—

(1) To keep the machinery of an up-to-date small reeling and process factory going.

(2) To advise and help those who intend to set up reeling and process factories.

He should first of all have a general idea of sericulture, reeling and processes as carried on by the people in India. Then he should be deputed to Japan, France and Italy, and if possible also to America, to study how reeling and processes are carried on in those countries. He must then adopt up-to-date machinery in his reeling and process factories.

The functions of the dyeing assistant should be to carry out dyeing and also printing according to the needs and requirements as they are or as new ones arise, and to teach and help those who want to start dyeing and printing houses. He should be a graduate in chemistry, should first of all acquaint himself with the processes of indigenous dyeing and then be sent outside for training.

4. Production is best left to the Provinces but should be backed by the central research work (noted above) which will have cognisance of the requirements of the whole country. The Imperial Sericulturist should be a practical Sericulturist with thorough knowledge of Indian conditions. He must work in close co-operation with the provincial departments and should be able to give proper advice when new attempts at sericulture are made.

(*a*) In new places the only sound and probably the best method of introducing sericulture is to start with actual demonstration of mulberry growing and rearing. When people take it up the demonstration centre is to be developed into a seed-supplying nursery and there must be arrangements for purchasing the cocoons for cash. When many people take it up there should be a reeling factory among them.

In the two biggest existing areas of production, *viz.*, Bengal and Mysore, there is scope for development of nurseries for seed supply as the present supply meets only a small part of the demand. Serious attempts should be made to start seed-supplying nurseries among all the rearers and, with a proper kind of worm spinning superior cocoons, these nurseries can be profitable private concerns. In this manner seed rearing will be a specialised industry, as it should be, in properly organised sericulture.

(*b*) If reeling is properly organised in direct touch with the market there will be scope for many reeling factories among the rearers. This must be done. The days of coarse home reeling are fast disappearing. Filatures should be located among, and deal directly with, rears. They should carry out re-reeling or several filatures may combine to carry out re-reeling. As regards reeling machinery, up-to-date European machinery is expensive and on the other hand high class thread for the Indian market can be turned out by simple locally manufactured machines which require less capital. This requires experiment and research.

(*c*) Throwing should be carried out in up-to-date throwing mills. Several filatures may combine to have a throwing mill.

(*d*) Dyeing should be carried out in dyeing factories or dye houses. Weavers should have yarn which they can use straightaway.

Provincial departments should be able to organise sericulture, reeling, throwing and dyeing with advice and help from the Imperial Sericulturist, who again will be the connecting link between all the Provinces. As regards research the provincial departments are in a hurry to get results and are likely to lose sight of the necessity of continued research for improved multivoltine races, as the Mysore department is actually doing at present and the Bengal department did before. Also the Imperial department will be in the best position to carry out research work with regard to univoltine races. The provincial departments can thus do without research and need concern themselves with development only.

5. The thorough study which the Imperial department will thus be in a position to make of the whole industry will enable a proper idea to be formed as to the necessity or otherwise of protection. If necessary there should be no hesitation in resorting to protection in the interest of three million or more persons drawing their livelihood from the industry. Those who can afford to buy and wear silk will certainly be able to bear a little extra cost.

The above, briefly, will be some of the important functions of the Imperial Department of Sericulture. As it will study the industry as a whole, this department will be in a position to do a good deal more good work than can be defined or foreseen.

If the industry is organised in the manner suggested it will afford scope for the employment of many educated young men as independent seed growers, reelers, throwsters and hand-loom factory owners if they can find the capital, or as paid foremen in such factories. The Imperial department can thus develop into an institute for training such men. This is the condition at present in Japan.

Lac Culture.—Lac is mainly a forest product. As far as is known *cajanus indicus* is the only cultivated plant on which lac will grow. But the lac crop on it is frequently not available before one and a half years and therefore hardly economical except under special circumstances. Lac culture on other plants like *zizyphus* pre-supposes sufficient waste lands on which the plants can be grown and this and other plants take several years to grow to become fit for inoculation. Lac culture by ordinary cultivators will therefore remain limited to particular areas.

QUESTION 22.—CO-OPERATION.—(*b*) (*vii*) Societies for joint farming. I am speaking from experience of my own and neighbouring villages in Bankura district in Bengal. When a cultivator has several able sons or when several brothers live in a joint family all working in the fields, the family continues to be in a flourishing condition. When, however, there is separation and the different members begin to cultivate their share of the lands and have to engage labour for carrying out the operations, their downfall commences. All become poor, run into debt and ultimately most of them lose their land. If any of these happens to have several sons able to work in the fields he improves his lot very soon, even by cultivating lands of others on the share system when he does not possess sufficient lands of his own. Whenever such a family manages to get a sufficiently large holding in one block, wells are sunk and various improvements made. I have seen several families rise and fall in this manner. Large families in the case of real cultivators are a blessing; it is one form of joint-farming. In order to teach and spread the principles of joint-farming, education and propaganda are necessary.

Oral Evidence.

64183. *The Chairman:* Mr. Ghosh, you are Entomologist, Mandalay Agricultural College?—Yes.

64184. We have your note of evidence. Is there anything that you would like to say beyond that? Do you wish to make any corrections?—I want to say something about the protection of crops and legislation for that purpose.

64185. Do you think that a special measure in the way of a Pest Act is desirable for Burma?—About two years ago, the Mycologist and I went into this question and we recommended some measures for special protection for Burma as against the other Provinces of India, that is for preventing pests from coming into Burma from India. That is external legislation; we also recommended legislation for checking insect pests within the Province itself, for instance the palm beetle.

64186. Is it the case that there are several serious pests in the rest of India which have not yet penetrated into Burma?—We know three or four definitely.

64187. Could you name them?—One is the *chilo simplex*, which occurs in paddy, *juar*, etcetera, in India. The others are borers in sugarcane and cotton.

64188. Could you give the Commission some idea of the general lines on which you are working at this moment?—At the moment I am devoting a good deal of time to the development of sericulture; my duties here are observation and study of pests generally and in this line I am devoting special attention to cotton pests. As a matter of fact this is the principal work on which I am engaged at present.

64189. Have you any pests which threaten your crop in Burma, which do not attack cotton in other Provinces?—All the recognised pests are here except borers in the stem found in Madras and certain other places in India.

64190. Any others that are not in India?—All of them are here.

64191. Does the problem of pests that attack cotton in Burma present any difficulties or complications which do not arise in the case of the same pests in relation to cotton in India?—I cannot say.

64192. Are you in touch with the Imperial Entomologist at Pusa?—Yes.

64193. Do you consult him occasionally?—As regards pests I have not done so up till now for the simple reason that I was myself at Pusa for fifteen years and there I made a study of all these pests. As a matter of fact, as to the common pests I know all that Pusa itself knows.

64194. How long is it since you were at Pusa?—I left Pusa in October 1920.

64195. Do you not think that there is a possibility at least that some advance might have been made at Pusa since you left?—I see the reports and find no change.

64196. Otherwise there is no touch between your work and the work done at Pusa?—Occasionally I have some correspondence with them. I had occasion to get pests identified on two or three occasions.

64197. Have you sent any specimens for identification to Pusa?—Yes, on two or three occasions. As a matter of fact my collection has not been very well sorted out and I am not devoting much time to the collection now.

64198. What is your conception of the result of the relation which might exist between your suggested entomological section of the Indian Museum and the provincial agricultural departments? Are you going to have some organic link between these two?—The Indian Museum will do only the systematic side of it. If I want any pest to be identified I shall send it to them.

64199. I should like to ask you why you prefer this system to the existing system according to which, as I understand it, Pusa should do any fundamental work that requires to be done?—At present I do not know that Pusa is doing the work as it should be done. I will just give one instance. There is a pest on mango which occurs in Assam, Burma and in East Bengal, and my opinion is that Pusa ought to tackle such pests.

64200. Is not that rather a criticism of the work being done at Pusa than a criticism of the principle of the organisation as it exists?—Principally of the organisation as it exists and not of the work done at Pusa, because I myself have been at Pusa for a very long time.

64201. Is it your duty to assess the commercial possibilities of silk culture? Are you responsible for advising whether, in the face of the competition of artificial silk, the department would be justified in recommending any important extension in sericulture in Burma?—I have studied the question, but I am not responsible for such recommendation.

64202. What conclusion have you arrived at?—In my note I have given it as my opinion that artificial silk will not interfere with the natural silk in India at least. Artificial silk may compete with, say, fancy cotton goods especially now that they are trying to lower the price of artificial silk.

64203. What makes you think that artificial silk will not threaten the market for the genuine article?—In India silk is used for particular purposes; for example, the Hindus wear silk on ceremonial occasions. If they know what artificial silk is they will never purchase it, because they will wear pure silk and nothing but pure silk. So there is a very big market for it.

64204. Have you any idea as to what proportion of the total silk fabric that is bought is used for ceremonial purposes?—Among the Hindus I should say about seventy-five per cent.

64205. Is it the case that on religious grounds there is an absolute bar to the use of artificial silk for these ceremonies?—Yes, that is so.

64206. The imports of artificial silk have risen in value from Rs. 64,000 in 1921-22 to over Rs. 15,00,000 in 1925-26. That is a formidable increase, is it not?—Yes.

64207. Do you think that means that people have given up wearing cotton fabrics or some other fabrics and have taken to artificial silk, or does it mean that artificial silk has, to a very considerable extent, taken the place of the natural article?—Artificial silk has taken the place, to a certain extent, of the natural article, but although there has been such a huge increase of artificial silk, there has not been a corresponding decrease in the import of the natural article.

64208. I think you have also interested yourself in bee-keeping?—Yes, I kept Italian and Indian bees.

64209. Did you meet with any prejudice against the keeping of bees?—This work was done while I was at Pusa and there was no question of prejudice because I did it simply as a matter of experiment. The Italian bees were kept for three years and we obtained very good results from them.

64210. You tell the Commission that Italian or other suitable bees should be made available at small cost. Have you satisfied yourself that there are no religious or other objections to the keeping of bees?—There will be no religious objection because there is no taking of life.

64211. Not even to the taking of honey?—No.

64212. Is there any objection to lac culture on the ground that it involves the taking of life?—Lac culture is carried on only by a certain class of people among whom there is no such objection.

64213. I judge from your answers that there is an objection from other sections not now engaged in lac culture?—There should not be any such objection, because the resinous substance is used nowadays and the insects are allowed to go out, so that no taking of life is involved.

64214. In reply to Question 17 on page 328 you say : "Lac culture on other plants like *zizyphus* pre-supposes sufficient waste lands on which the plants can be grown and this and other plants take several years to grow to become fit for inoculation. Lac culture by ordinary cultivators will therefore remain limited to particular areas:" that is to say, areas in which there is sufficient waste land to make the planting of these trees possible: is that so?—Yes.

64215. *The Raja of Parlakimedi:* In answer to Question 2 you say: "Attempts to teach agricultural methods through elementary text-books only create laughter." The text-books need not be entirely upon indigenous methods of cultivation. If they were on methods of improved culture or to prove to the people the effects of manures, would they not be popular?—I am thinking of primary schools here.

64216. If you could reduce the standard of the book in order to create an interest in the minds of the children, do you not think that that would be a sound thing?—My idea is that probably it will be a waste of effort to try to teach boys between the ages of seven and ten.

64217. But even at that age they help their parents in cultivation work?—Yes, they do.

64218. In elementary books which are used in the primary schools I do not think that abstruse subjects should be dealt with. Are you not in favour of any agricultural instruction in the rural schools?—No, I am not for any such instruction at all.

64219. How would you try to improve their knowledge of cultivation?—I would improve the standard of literacy, so that all might be able to read the pamphlets issued by the Agricultural Department. That is one consideration. Then, improvements in agriculture can best be shown by demonstration.

64220. We are talking of giving them lessons?—I would not try to teach agriculture in elementary schools. I would improve the literacy of the people and if any improvement in the agricultural side is needed I would have it done by means of demonstration.

64221. If you try to create a taste in literacy would you not be running the risk of tempting young boys to take up higher education and leave their bread and butter vocations?—I do not think so.

64222. But is it not the general tendency nowadays, when a little education has been acquired, for the boy to seek an appointment rather than follow his father's occupation?—Of course that is the tendency nowadays, but I do not think that teaching students agriculture will encourage them to take advantage of it.

64223. What I mean to say is that when you have got books on agriculture, if you make them easy for the children to follow they will show a greater tendency to take to agriculture than would be the case if you made the books conform to a high standard?—My idea is that you can teach a great deal more through demonstration than you can hope to do by books.

64224. You say that in rural areas school plots and school gardens are not necessary; if not, how can you demonstrate?—I do not mean demonstration to school boys. In rural areas there is no dearth of material to teach nature study; what is required is a teacher, not school gardens; if there are efficient teachers it can be easily done.

64225. You do not want school gardens?—I do not, because there is no dearth of material for teaching nature study.

64226. How can you impart knowledge to students regarding the different stages of plant growth?—If there is a good teacher it can be done without a school garden.

64227. Can you do it with the staff available?—With the kind of primary teachers we have now, it is no use; it is better not to try to teach it at all rather than get the present primary teachers to teach it.

64228. Do you say that it is no use teaching nature study?—It is of use; but it should be done by properly qualified teachers.

64229. As far as you know, how many such teachers are available at present?—Very few because no attempts are made to train them.

64230. What encouragement and facilities should be given to them?—When these teachers are being trained in the training schools they can be taught nature study; then they can teach it to the boys.

64231. There is no provision for training them at present?—No.

64232. Can you give us an idea of what it would cost?—To teach nature study in a training school, there should be a properly qualified teacher for it; the cost would be the cost of the teacher only.

64233. What about the necessary equipment?—The necessary equipment would not cost much; I think a hundred rupees would be enough.

64234. You think that that amount would be easily forthcoming?—Yes; I think it would be forthcoming.

64235. In answer to Question No. 2 (*xii*) you suggest night schools for adults and boys in rural areas. Have you had any practical experience of these schools; in other words, have you had occasion to watch the attendance at the schools and the results obtained?—In my student days I taught in them myself, and recently in Maymyo I saw an adult school and there is a good attendance there.

64236. Do you think the students do really take an interest in the work after a hard day's work in the fields?—If the teaching is made interesting, they take it as a recreation. That is my experience of my village.

64237. You mean boys who return from work in the fields?—Young boys of the ordinary cultivating class who have to do field work.

64238. You think that such schools will be a success in Burma?—I think they should be.

64239. Have you any solid reason for thinking so?—Yes; I said there was a school in Maymyo and I saw what work it was doing. That school is still in existence.

64240. The population is fully engaged in field work; and there are no superfluous people who can go round; is that the position?—In the villages there is no superfluous population.

64241. Would you advocate bee-keeping in preference to silkworm-rearing?—Bee-keeping does not occupy much time at all. In the plains the honey flow season is the spring, and the work lasts only two months; the man has to go at intervals of three or four days to collect the honey; it is very easy work.

64242. You would not advocate sericulture as a popular industry?—I do advocate sericulture.

64243. Do you advocate it in preference to bee-keeping?—There is no question of preference; if possible, I would have both, because bee-keeping does not take much time.

64244. You are convinced that bee-keeping would be just as popular as sericulture and that it would be a paying industry?—It would pay provided there was the proper bee.

64245. In Burma?—In Burma and in India.

64246. I do not know whether bee-keeping will compare favourably with sericulture as an industry?—The two industries are different in nature.

64247. Would you recommend both?—I would recommend both.

64248. Do you think that bee-keeping will bring as much income to a person as sericulture?—Sericulture is an industry which can be carried on throughout the year in many places, and in some places for a greater part of the year; bee-keeping on the other hand, will only occupy a man's time for about two months in the year.

64249. *Sir James MacKenna:* What is the principal use to which honey is put in Burma?—It is used for eating purposes, not for medicinal purposes as in India.

64250. Do you think there is a prospect for the expansion of the silk industry in Burma?—As a matter of fact we are expanding. In Leiktho there has been an expansion.

64251. You have no idea what the possible ultimate expansion may be, I suppose?—It is capable of very great expansion; I can say that much.

64252. What is the experience with the Criminal Settlement at Paukkoung?—The settlement was started only in October last, and they have planted mulberry this year.

64253. So that no progress has yet been made?—They have got their mulberry ready; they can begin silkworm-rearing now.

64254. *Professor Gangulee:* You say that there had been an expansion of the silk industry in Burma; do you mean expansion in weaving or in silkworm-rearing?—I was referring to silkworm-rearing.

64255. Do you think the religious scruple amongst the Buddhists, which prohibits them from killing animals, is really a handicap to the expansion of the silk industry?—It is a handicap amongst the Buddhist Burmans, but there is a huge population in some districts which is not Buddhist, and even among Buddhist Burmans they have no objection if there is a tradition of sericulture with them.

64256. Are they not Buddhists?—They are.

64257. Why do they not object?—When silkworm has been reared for a time in a district, a tradition grows up.

64258. Does economic pressure induce them to take to it?—Yes; as a matter of fact in the Monywa district a respectable headman told me that if there was money in it, there was no objection.

64259. So, religious belief goes overboard the moment the question of extra income comes in?—With some people.

64260. That is a good thing too. With regard to artificial silk, is it not the case that people who buy artificial silk fabrics buy them in the belief that they are real silk?—It is so.

64261. Is it very common?—Of course I cannot speak for the whole country. In some cases they do.

64262. But such cases have come to your notice?—Yes.

64263. Would you favour an import duty on artificial silk?—That is a question which requires investigation; I cannot say definitely.

64264. Is there any import duty at present?—The import duty was 15 per cent, and I think it was reduced to 7½ per cent.

64265. You are in charge of sericulture; is any research going on?—Yes; I am carrying on research.

64266. How many assistants have you?—For sericulture proper I have four assistants.

64267. Where were they trained?—Two of them had some training in the Bengal department, and the other two I have trained myself.

64268. Where?—Here.

64269. Do you find them quite efficient in their work?—Yes; they are quite all right.

64270. What particular line of research are you conducting with regard to the silk industry?—The whole idea is to get more silk from the cocoons. I am directing my attention towards producing better cocoons which will give a larger quantity of silk.

64271. The races of silkworm in Burma are multivoltine?—Yes.

64272. How does the yield of your multivoltine races compare with the yield of the Chinese and Indo-Chinese silkworms which are also multivoltine?—The yield is about the same.

64273. And the quality?—About the same.

64274. I think that, in India, it is only in the Punjab and in Kashmir that they have the univoltine race; nowhere else do you have the univoltine

silkworm in India; the Bengal worm is multivoltine; so also are the Mysore races. What factors determine primarily the races of the silkworm in a given tract?—Climate, primarily.

64275. Do you find that the climatic conditions of Burma are not quite suitable for univoltine worms?—They are unsuitable.

64276. In Japan they carry on the silk industry with univoltine worms, and their yield is therefore better. Could you tell us whether there is any prospect of introducing univoltine worms in Burma?—There is no such possibility.

64277. With regard to diseases, are you much troubled with pebrine?—Just now I am not. So far as my own experiments go, I have no pebrine at all.

64278. Is that due to any climatic conditions?—It is due to care. By examination I keep my worms free.

64279. Do you adopt Pasteur's method or Hutchinson's method?—I adopt Pasteur's method.

64280. You think Pasteur's method is better than Hutchinson's?—They are practically the same. Pasteur crushes the whole body. Hutchinson crushes the gut. There is no other difference.

64281. You have given us a very interesting note on the silk industry, and you suggest that a central agency is required to study and co-ordinate the whole industry and trade in India and Burma. Have you formed any idea as to the constitution of the agency, and where it should be located?—I have stated that in my note.

64282. You have not suggested a place where you want to have it? Would you like to have it in Burma, in India or in Kashmir?—If the officer is appointed, he will select the place afterwards.

64283. Why do you advocate a central agency for the purpose? Have you any special reason?—The rearing of silkworms cannot flourish without utilisation of the silk, and utilisation of the silk depends on reeling in a particular way. Nowadays in India reeling is very bad, and that is why the silk produced in India is being ousted by foreign stuff. The central agency will study the requirements of the qualities of silk all over the country, and that agency will be in a position to tell the reelers what particular qualities of silk are required.

64284. That agency will be a bureau of information?—Not only information, but for work as well.

64285. You would ask the central agency to carry on investigations?—Certainly; research work: that is what I have said.

64286. You describe sericulture as a subsidiary cottage industry. Is it really so, or is it a cottage industry?—I mean, subsidiary to agriculture.

64287. Do you think the cultivator in Upper Burma who owns ten acres of land would also go in for sericulture?—Just now there is no one here who does that.

64288. It is not a subsidiary cottage industry; it is a cottage industry, only for the weaver class?—The weavers and the rearers are the same in Madras, but they are different in all other parts of India.

64289. Do you consider sericulture to be a subsidiary cottage industry, or would you consider it to be a cottage industry?—I would consider it a subsidiary cottage industry.

64290. In what way?—The cultivator will be mainly concerned with agriculture.

64291. The cultivator is not always the weaver?—He is not the weaver. The rearing of silkworms need not necessarily be done by weavers alone; it can be done by any cultivator.

64292. Do you know of any cultivator in this tract who rears silkworms?—In this district there is none, but in Leiktho all the rearers are not weavers; in Prome district they are not weavers.

64293. You suggest centralised research in economic entomology?—As distinct from systematic entomology.

64294. Your criticism of Pusa, as I understand it, is that Pusa is paying more attention to systematic entomology than to economic entomology?—Yes, nowadays.

64295. You would divide these two aspects of entomological research?—Systematic entomology deals only with the classification of the adult insects, while economic entomology will have to study the life of the insect as a whole.

64296. Your systematic entomological work will be in the hands of the museum?—Yes; that is what I suggest.

64297. And your economic entomological work will be carried on in Pusa?—That is my idea.

64298. Supposing we had a central station to carry on economic entomological work, do you think Pusa would be a suitable centre for it from the climatic and other points of view?—Entomological work has been carried on in Pusa for more than twenty years, and the major portion of the economic work was done at Pusa, and, as I said in answer to a question put to me, the bionomic study of the pests will have to be carried out where the pests occur. It is no use studying a pest which occurs in Burma by taking it over to Pusa and doing the work there.

64299. Therefore, you will have provincial research stations as well?—I want central research; all this research work will be controlled by a central agency.

64300. Do you include veterinary entomology in economic entomology?—Entomology is such a vast subject that I think the veterinary departments will probably find it better to tackle that subject themselves, as the medical department is doing at present for medical entomology.

64301. Do you know that some work is now being done in Pusa on flies which carry diseases?—It is being done there, but I think the proper work for Pusa should be crop pests, economic entomology.

64302. Would you include in that insect parasites?—Certainly.

64303. *Mr. Kamat:* Is it not the case that the wearing of silk on certain ceremonial occasions has been enjoined since olden times, that it is almost as old as Buddhism?—Yes.

64304. Indeed, religion would not have enjoined the wearing of silk if silk had not been produced in India or Burma in olden times?—Probably that is so.

64305. Do I gather from your replies that the import of artificial silk of late years is not materially affecting real silk industry?—As far as the figures go, that seems to be the case.

64306. But in your opinion, the effect on the silk industry is not important?—Certainly, to a certain extent, the silk industry is being affected.

64307. A good deal of artificial silk yarn has been imported during the last three or four years?—Yes.

64308. According to the figures you give on page 314 of your leaflet, the import of artificial silk yarn in value of rupees last year was Rs. 74,00,000, while five years ago it was only Rs. 4,50,000?—Yes, that is so.

64309. All this silk yarn is woven in the country into silk cloth?—That is so.

64310. Similarly, if you take it by weight the figures show that 2,600,000 lb. of artificial silk yarn were imported during the last year, as compared with 70,000 lb. five years ago?—That is so.

64311. These figures disclose that the real silk trade is affected, not to a very small extent as you say, but to a substantial extent?—We have also to look to the imports of real silk.

64312. You think, taking these figures into consideration, that there is no danger to the real silk industry in the country?—Yes.

64313. Which figures are you referring to?—Table I will show that.

64314. The value of silk yarns and manufactures in 1925-26 was Rs. 2,80,00,000, while five years ago it was Rs. 2,98,00,000. Is that the figure that is giving you encouragement?—There is no question of encouragement. My inference is that the real silk trade is not being very much affected by artificial silk.

64315. As artificial silk yarn is coming in in such large quantities, from Rs. 4,50,000 worth to Rs. 74,00,000 worth in five years alone, and as it is being consumed in some state of manufacture, would you not take notice of these large imports with a view to saving the silk industry of the country?—That brings in a very broad question.

64316. *U Ba Cho:* Apart from research work, you do a certain amount of propaganda work?—Yes. I do.

64317. Do you pay any attention to the beetles which destroy cocoanut palms?—Just now I have a fieldman who is going about demonstrating what is to be done.

64318. In the course of your propaganda work, do you meet with any difficulty due to the religious scruples of the people?—I have been doing that work for the last two years, and I now see that the villagers are sympathetic instead of being apathetic.

64319. Would you recommend legislation for the control of the pest?—If the pest is to be checked all over the Province, as it should be, my idea is that nothing but legislation will do it.

64320. Do you notice that this pest is spreading all over Burma and is doing an immense amount of damage to the cocoanut palms in the Province?—Yes, it is doing an immense amount of damage, and is spreading towards Upper Burma.

64321. You send out pamphlets to the people depicting the damage done by these pests, and the mode of killing and destroying them?—Yes; I have issued big posters and pamphlets, and you will see them when you come to visit my section.

64322. Do you think these posters and pamphlets have had any effect on the minds of the people?—The little pamphlets have produced a very good effect. Formerly, when I went to the villages, the people knew practically nothing about the pests, but now they come forward to explain to me the life-history of the insects.

64323. Speaking about sericulture you say that the people in Prome, Toungoo and recently the Karens have taken up this industry. By Karens, you mean the Christian Karens?—Yes.

64324. Is it a fact that the standard of living among these people is very low?—It is among such classes of people that sericulture will flourish best.

64325. Do you think that the average Burman Buddhist would take up this industry?—I spoke to a headman from Manywa and he said that he would have no objection to taking it up if there was money in it.

64326. Is he a Chin?—He is a Burman Buddhist.

64327. Do you think that indigenous silk will be able to compete with imported silks, both as regards quality and price?—We have to improve our methods of rearing and reeling and then I think it will surely be able to compete.

64328. Do you think it will be able to compete with silk imported from China and Japan?—Yes.

64329. So far we are getting all our silk from China and Japan?—Mostly from China.

64330. The silk produced here is very small in quantity?—Not only small in quantity but of very poor quality.

64331. Do you think that the modern method of bee-keeping which you advocate would not necessitate the taking of life?—Not at all.

64332. You will be depriving the poor bees of their legitimate food?—We take the surplus honey in the honey flow season and in seasons of scarcity we have to feed the bees and we can do it with sugar syrup.

64333. Do you think that bee-keeping would not be against the scruples of the Burman Buddhists?—Not at all. There is no killing in bee-keeping.

64334. Do you think that the lac industry entails the taking of life?—The young insects go out of the old encrustations and settle on the branch and we can take away the old encrustations. There is no loss of life involved in the industry.

64335. You have four assistants under you. How many of them are Burman Buddhists?—There is no Burman Buddhist.

64336. *Sir Thomas Middleton:* In answer to Question 2, you say that a certain number of people are interesting themselves in training students with a view to make them gentlemen-farmers, as you describe it. You say that there is probably no other alternative if the educated classes are to take up agriculture. What is your own view? Are the educated young men in Bengal inclined to take to farming? You know the Bengalee best, I suppose?—I can speak of two or three whom I know. At least three matriculates are cultivating their own land.

64337. And doing well?—Quite well.

64338. They are cultivating their father's land?—Yes.

64339. Do you think there is any prospect at all of finding employment for the unemployed middle class people on the land, if you educate them in agricultural colleges?—Simple education in a college will not do. They must also be provided with land and easy means of finance.

64340. These cases that you mention in your note are known to you?—Yes; they did not receive their education in an agricultural college.

64341. But they were educated people?—Yes.

64342. And they had experience of agriculture?—Yes; they knew agriculture from their boyhood.

64343. You make another statement which, I think, wants some qualification. You say that a large family in the case of real cultivator is a blessing?—That is my experience.

64344. Should you not qualify it by saying 'provided sufficient land is available'? You must know many areas in Bengal where land is too limited?—That is so.

64345. You were probably thinking of Burma when you made that statement?—My experience, as I said, is confined to my own village. When a cultivator has several sons to work in the fields or when there are several brothers working together, they flourish. The moment they separate, their downfall commences.

64346. Do you agree, however, that there must be enough land to begin with?—That is so, but even if they have no lands of their own they can cultivate lands on the share system.

64347. Have you any pink bollworm in your cotton? When did you first see it?—It was known about twenty years ago.

64348. At the time it first attracted attention in Egypt, you had it here?—Yes.

64349. Can you say whether it is spreading in Burma?—It is found all over Burma.

64350. Is the damage increasing or does it fluctuate from season to season?—It is sometimes worse, sometimes better; it fluctuates.

64351. You have no reason to fear that it will rapidly become such a pest as to make cotton-growing unprofitable in Burma?—As it is, it is already bad; I do not think it will become worse.

64352. Have you seen the damage in other parts of India?—I had seen it in Bihar.

64353. When you were in Pusa, did you study the pink bollworm?—Yes.

64354. Did you see any indication of its rapid increase?—At Pusa, we did not have much cotton cultivation and I did not have an opportunity to make a detailed study of the subject.

64355. Are any special measures taken in Burma against it?—No. For the present it would not be practicable.

64356. Why?—Because the cultivators gin a portion of their own *kapas* for seed. It is very difficult to tackle each cultivator separately.

64357. You can only deal with cotton when it comes to the gin?—Yes.

64358. You point out the need for centralising entomological collections in India. At present you have a museum in Pusa and also one at Dehra

Dun. Are there any others?—There is a small collection at Coimbatore. I have got a small collection here too.

64359. In answer to Question 4, you differentiate between agricultural chemistry and botany and agricultural entomology, mycology and bacteriology which you say should be central, with provincial subordinate staff. What induced you to differentiate between the two groups? Is it the question of staff?—It is not the question of staff. I was thinking of research work only and on the analogy of entomology I grouped mycology and bacteriology.

64360. Take, for instance, a medical practitioner in a big town, who has to deal with a wide variety of diseases, and a practitioner in a small village whose scope is very limited. The man in the village has not the same opportunity to study diseases as the man in the town. Is that the idea underlying your suggestion?—My point is this: many of the pests occur over different Provinces. As an entomologist of this Province I cannot visit any other Province, and as long as my study is confined to one Province it can never be complete. If there is a central organisation, there may be one man working on a particular pest and that pest may occur in four or five different Provinces.

64361. You would have your entomologists in all Provinces, one group of entomologists taking up a particular group of pests?—I think that will be very efficient.

64362. You would have a separate group dealing with pests in relation to sugarcane, and so on?—That is exactly what I am thinking of.

64363. *Dr. Hyder:* With reference to the gentlemen-farmers that you have been speaking of, are there any people from Bengal who have taken up land under the Government of Burma?—I do not know of any.

64364. All the other Indian races have come over to Burma, but not people from Bengal?—I know of one case only in which a Civil Surgeon in the Maubin district obtained a grant of land and his sons cultivate that land.

64365. Do you grow the caster plant here?—Yes, on a small scale.

64366. There is some scope for the extension of *eri* silk, is there not?—No.

64367. Have you not got large areas in Burma where you can grow the mulberry tree?—Yes.

64368. You have a Botanist here in the College?—Yes.

64369. *The Chairman:* What do you regard as your most successful piece of work since you came to Mandalay?—I tackled one pest in the Mon Canals area, a borer pest in paddy; it was causing very great damage to the hot weather paddy, almost to the extent of seventy-five per cent; that damage has been completely stopped; I studied the pest and by changing the time of planting I avoided the damage entirely. I have done some work on crabs damaging paddy seedlings. The method I adopted is one which has also been adopted by Madras and in Ceylon with great success. It is being carried out by the Economic Botanist, and by the Professor of Agriculture, in the experimental areas here and it has been thoroughly successful.

64370. What does it consist of?—I trap the crabs by placing a pot into which they fall at night. The next morning the crabs are removed. I have also done some work on sericulture; I have improved the cocoons.

(The witness withdrew.)

APPENDIX.

The witness submitted the following note in order to give a fuller explanation of the points raised in questions.

[Reference—The Chairman's question with regard to my answer to Question 1 (*a*). I submit this note for fuller explanation of the point.]

There is an important Entomological section in the Indian Museum containing a valuable identified reference collection and on many occasions Pusa, Dehra Dun and all other institutions dealing with entomology have to send specimens for identification to this place. I suggest developing it on the lines of the British Museum.

Identification is capable of being done only by specialists. It is generally possible for one to become a specialist only in a small group to which he devotes his whole time. Reference to a large collection and literature is also necessary for this work. All institutions maintaining a collection in India, the Indian Museum, Pusa, Dehra Dun and others, have to send the specimens for identification to such specialists all over the world. In the beginning the Provinces used to send specimens to Pusa and Pusa used to send them out to specialists. Now the Provinces are sending specimens direct to specialists. I do it, and I know Madras does the same. Pusa maintains an identified reference collection and the Provinces too have now got an identified collection as is required for their work, thus generally doing away with the necessity of any reference to Pusa.

Maintaining a large collection is really museum work requiring a lot of time and the time devoted to it by agricultural entomologists should, properly speaking, be devoted to economic work. To be a systematist one must be at it so thoroughly that one has no time to think of other problems.

If the collection is centralised as I suggest, the systematic work will be efficient. Any one trying to specialise in any group will have at one place the collection from the whole of India.

I think I have now been able to express myself sufficiently to be able to say that identification of specimens is by no means of the nature of fundamental work which the Provinces expect from Pusa and also, as I have explained above, Pusa cannot be expected to be able to do this work. Even if the Pusa Entomological Section be expanded according to the Imperial Entomologist's proposal it will be many years before systematic specialists develop and it is doubtful if specialists in all groups will ever develop. This has happened nowhere. Personally I do not think that a large expenditure on the development of systematic entomology and on bringing out systematic specialists at high rates of pay is at all justifiable. With facilities at the Museum systematists will develop. The provincial entomologists are directly dealing with the pests occurring in the Provinces and they know, or at least are expected to know, the behaviour of these pests in their own Provinces more intimately than Pusa. Pusa therefore will be of absolutely no help to the Provinces, as far as pests are concerned, unless it carries out intensive study and research on economic lines, as I suggest.

As regards the link in my proposed scheme between the Indian Museum and the different centres of entomological work, all the centres will send their whole collections as they are made to the Indian Museum which will identify what it can and get others identified and report the result and where required will send back duplicate named specimens. In this manner the survey of the insect fauna will be more efficiently and quickly done than is the case at present. Properly speaking, this survey is more the work of the Zoological Survey Department than of agricultural entomologists, though as regards pests it is of value to the latter for knowing distribution and occurrence. The agricultural entomologists working in the Provinces have the opportunity of making collections. I want to relieve them of the work of getting identified, and maintaining, any collection beyond what is required for their work. In some cases however what actually happens is that some economic entomologist comes to specialise in a group to which some pests belong and the collection of such a group is built up principally by his own work. It should be compulsory for such collections to be deposited in the Indian Museum; otherwise, with his departure and the consequent lack of interest, the collection may be spoilt. Also such collections (excepting duplicates) must not be allowed to be taken out of India.

Mr. H. F. ROBERTSON, B.Sc., I.A.S., Deputy Director of Agriculture, Myingyan Circle, Meiktila.

Replies to the Questionnaire.

(The replies apply only to the Myingyan Circle and the Dry Zone.)

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(*a*) In my view the only successful measure in influencing and improving the practice of cultivators is to carry out "demonstrations on their own and neighbour's land and under the ordinary conditions." All other lines of propaganda in the absence of this one have a very minor effect, if any. Government experimental farms such as central farms have little effect as the cultivators rightly discern that conditions are not the same. Propaganda by leaflet, lecture, lantern slide, etc., may draw attention and encourage a cultivator to volunteer a trial or demonstration on his land but they will not make him take up the practice and it might have been just as well to begin with the demonstration. When this has been successfully made these measures of propaganda may be used to advantage to call the attention of others to it and to explain and describe.

(*b*) I can suggest little further than I am doing at present. The main point is to provide enough money and staff to enable the Agricultural Department to carry out the field demonstration properly. With regard to staff I would recommend the permanent appointment of men of the ordinary working cultivator type after training as labourers on a central farm carrying out practical demonstrations under a senior Agricultural Assistant. Temporary appointment is in my opinion not suitable and one, or two at most, to each senior Agricultural Assistant would be necessary. At times of special stress of work, *e.g.*, sowing season, extra temporary demonstrators may be recruited for short periods from the labourers of the central farm and their places made up by casual labourers. This means having a surplus of trained men on the farm (*i.e.*, not surplus to labour requirements but more than is required for any expert operation, *e.g.*, drill-sowing) and scope is limited.

(*c*) Beyond what has been said above and the necessity for the officers of the Agricultural Department first winning the trust and confidence of the cultivators, I would suggest "best holding" competitions, *i.e.*, prizes for the best-conducted holdings within a prescribed area, points being allotted on a definite scale for each item in a cultivator's running of his holding with special encouragement for adopting expert advice. The prizes would be distributed at the local agricultural show or durbar. Again, when an improvement entails capital expenditure beyond the means of an ordinary cultivator it might be a good thing to assist in financing it. This is done for instance in the case of "improved lay-out," (*i.e.*, erection of *kazins*, construction of drains, etc., to prevent erosion, loss of fertility by washing and damage to crops) by means of land improvement loans. But this would require careful handling.

(*d*) In this circle, during the agricultural year 1926-27 there has been a tremendous increase in the demand for *Theikpan* ploughshares. This has been due entirely to practical demonstration and the inherent advantages of the ploughshares. The former took the shape of sending round a man to villages who actually set up a share with its wooden frame on the spot (often using wood of no value just cut down in the jungle) and another who actually did ploughing when possible.

Again, in the same year and for exactly the same reasons, the demand for packets of copper sulphate for anti-smut treatment of *jowar* rose from a free demonstration issue of 2,000 packets for the 1926 crop to about 20,000 for sale for the 1927 crop.

Both these matters are however still in the initial stages.

QUESTION 5.—FINANCE.—(*a*) Apart from *taccavi* loans, which are discussed in answer to 5 (*b*), I am in favour of a type of registered co-operative seed purchase and sale societies which will provide seed and cultivators' expenses on a limited and defined scale according to the size of the holding of each member, and nothing beyond. If a loan is not repaid when due after harvest no further credit should be allowed until the debt is cleared. The initial members should be very carefully selected and limited and they will exercise discretion in the admission of later

nbers. A society of this type (but dealing with seed and implements ŕ) in the very early stages is doing well at Payitkon in Lower Chind- district and some three or four more are being formed. Such a society be very helpful to us in the spread of improved seed.

For long-term credit, an extended use of land improvement loans should if the proposals are carefully gone into by the Agricultural and Irriga- departments as in Meiktila district, where applications and reports he department on the proposals are placed before a district agricultural rovement committee for consideration. I am afraid anything more itious would not be successful here.

(*b*) One of the troubles is that agricultural advances do not reach the poorest who are most in need of them. It is difficult to suggest a edy without running a risk of losses but it might be got over by ting a first claim on a crop yet to be grown as security, as is done moneylenders, brokers, etc. Joint personal security has its own limits.

Then there is too much difficulty and trouble in applying for, obtaining and paying back the loans. I have known cultivators refuse seeds if given as an agricultural advance while they were keen to take if given on credit out of my seed and implement advance. Again, perhaps the system is too rigid, though probably necessarily so.

Especially after a bad season it would be a great help if part of the advance could be given in kind instead of money, *e.g.*, as seeds. Just recently cultivators after a very bad season with regard to cotton and early sesamum had to pay up to fifteen rupees and over for 100 *viss* of cotton seed of very doubtful germination power or up to 65 *viss* of *kapas* at harvest. Speculators early in the season had purchased at four rupees and when proposals were made by the Deputy Commissioner, Meiktila district, in conjunction with me to spend Rs. 30,000 of agricultural advance money on purchase of cotton seed it could have been obtained for not more than seven rupees. The proposal was not approved by higher authority and the money lapsed.

But it is no good inducing cultivators to make fuller use of *taccavi* loans if it simply encourages them to incur a larger capital debt owing to the lower rate of interest and ease of obtaining the loan, with little hope of being able to repay it out of income, and no intention of using it all for productive expenditure. This will only produce the state of affairs at which so many co-operative credit societies seem to have arrived. It seems necessary to safeguard the cultivator against himself, as selling him up is the last thing wanted. I would therefore rather support means for enabling more cultivators to use *taccavi* loans moderately than for inducing taking of larger individual loans and my remarks in first three paragraphs above are in this direction.

QUESTION 8.—IRRIGATION.—(*a*) (*ii*) In the dry zone generally, but especially in Meiktila district, there are many small tanks used for irrigating small patches of paddy and their number is being increased by the ready granting of land improvement loans (applications considered and resolved on by an agricultural improvement committee in Meiktila district). It seems to me that they could be made much more efficient if they could be supervised as to construction, repairs and making of channels for distributing the water by a subordinate irrigation officer.

The obstacles to extension are mainly the smallness of the areas and the lack of suitable places for making tanks.

(*iii*) I am of opinion that the possibilities of well or tube-well irrigation in the dry zone should be investigated by an agricultural engineer.

QUESTION 9.—SOILS.—(*a*) (*iii*) A system of improved lay-out for holdings (*i.e.*, construction of *kazins* and drains where necessary to hold up water and let it soak into the soil, and to prevent erosion, and loss of fertility by washing, and damage to crops) is being advocated at present and land improvement loans can be obtained for the purpose. This is of course working on a small scale and I have no large projects to propose.

QUESTION 10.—FERTILISERS.—(*a*) In my opinion, the only thing to be done at present is to make greater use of natural manure available in the shape of farmyard manure. When this has been done to the fullest extent, other forms of manuring may be considered.

To this end it is necessary to introduce methods for the improved making, storing and applying of more farmyard manure of a better quality. This is being attempted here by demonstration, special attention being given to the provision of bedding of some sort to take up the urine and prevent the loss of nitrogen.

QUESTION 11.—CROPS.—These are all a part of the departmental work at present [except (*a*) (*iv*) which does not apply here to any great extent], and I have nothing fresh to add.

QUESTION 12.—CULTIVATION.—(*i*) & (*ii*) There are matters under enquiry by the department which have not yet reached the stage of definite recommendation, except in the case of *Theikpan* ploughs, line sowing, drill-sowing with use of seed-drill, inter-cultivating, and much can be done with these.

QUESTION 14.—IMPLEMENTS.—(*a*) The use of the *Theikpan* plough instead of the indigenous one is an improvement ready to hand, as also the Indian seed-drill. But I would further suggest that the provision of more efficient implements within the means of the cultivators for dry-crop cultivation generally is a matter which would repay investigation by an agricultural engineer. Suggested implements required are, (1) an improved seed-drill, (2) harrow or harrows, (3) an implement for inter-cultivation, (4) an implement for collecting cotton and *jowar* roots, (5) an implement for harvesting spreading groundnuts.

With regard to introduction of new agricultural implements from abroad, the main difficulty is expense, for doubtless many of them would be useful. For instance, one of the least expensive, a bullock hoe or cultivator, costs at least about Rs. 30. Adaptations are also necessary.

(*b*) Where expense is the hindrance, an instalment system of sale under the seed and implement advance of the Agricultural Department or agricultural advances of district authorities would help. Otherwise, demonstration on the cultivator's holding is the only thing.

(*c*) It is essential that the implement be first distributed and popularised through the channels of the Agricultural Department. After that it will be possible to get local traders to take up the sale and I do not see why this should not be done.

Production in same way will be assured of a demand.

QUESTION 16.—ANIMAL HUSBANDRY.—(*a*) (*i*) I suggest selection within the Burmese breed itself and the establishment of at least one pure herd by the Agricultural Department. This may then be copied by private individuals. It would be necessary also for the provision of good bulls.

Further, I would suggest investigating the effect of a very slight admixture of Indian blood separately. In something like one-eighth or less crosses it seems of possible advantage; above that it is clearly undesirable.

(*ii*) Dairying is not usually taken up by Burmans as there are religious scruples against it.

At any rate it is first necessary to select a milking strain of pure Burmese cattle, or to ensure the non-crossing of outside breeds, introduced on large scale, with local cattle.

(*iii*) It is necessary that the breeding should become controlled and only good bulls used. Under the present system of letting all animals wander over the countryside there is no control, and it requires either education or laws, or both, to make control possible.

(*b*) (*i*) Except in Sagaing district there are few or no grazing grounds. The cattle graze all over when there are no crops on the ground, and on uncultivated areas, roadsides, hedgesides, etc., during the cropping season. My view is that, in the hot weather when things are at their worst, there are as many cattle already as can be carried through just alive on the natural grazing and water-supply available, and in a specially trying year a certain proportion have to go by the board.

It is only the work bullocks and bulls which receive stall-feeding ordinarily. Breeding herds are seriously affected and the cows particularly have a very stunted growth.

(*ii*) There are no enclosed pastures, except grass borders in tilled fields which in most parts are numerous. But grazing can only be done under picket when crops are on the ground and it is the work-bullocks or bulls, not the breeding cattle, which receive this grazing or grass.

(*iii*) Dry fodder consisting mainly of *jowar* (*sorghum*) stalks and some stems and leaves of pulses, is usually sufficient for work-bullocks and bulls only. It is eked out by grazing in off seasons. Many cultivators also make some hay from wild grasses. To the extent that breeding cattle are not fed on fodder and that in a bad season there is even sometimes a shortage for work-bullocks, it is insufficient. A carry-over from a good season would help in the case of work-bullocks but it is easier said than done by the cultivators.

A strong limiting factor in the supply of dry *jowar* fodder, especially in the more upland tracts, is the damage done by the pest "*Pwinbyu*" (*striga lutea*). No practicable method has yet been found for preventing this. Lines of work are (1) a short-lived quick-growing variety, *e.g.*, saccoline *jowar*, (2) a resistant variety, (3) drill-sowing with inter-cultivation and hand-hoeing close to and between the plants. If the weed can be prevented from seeding over a number of years it can be defeated, unless seed is brought in by water from other land.

(*iv*) There is almost a total absence of green fodder during the dry season and this has serious effects. In the case of work-bullocks these are mitigated by feeding of some oilcake (sesamum and groundnut).

(*v*) Not much about this is known here yet but I do not think under the conditions it is the, or a, vital point.

(*c*) This does not seem quite to arise here. The shortage, so far as the breeding and young growing cattle are concerned, is a grazing one and is most acute in March, April, and May. Rain in the latter part of May sets the grass-growing rapidly again and young growing cattle begin to thrive in a fortnight or so.

(*d*) As already mentioned in (*iii*) above the prevention of *striga lutea* would be a great help. An increased area might be suggested but this involves altering the whole cropping economy of a holding. Heavier manuring with farmyard manure would mean a heavier crop which, in turn, would help to maintain more cattle and provide more manure.

At present, with the low prices of some crops, *e.g.*, cotton, and the high prices bullocks are fetching, chiefly due to demand from Lower Burma, it would seem to me to pay the cultivator to use more of his land for maintaining more cattle. With this in view I have been advocating the rearing of several young bull calves by cultivators who have no breeding cattle.

Small plots of well-irrigated grass such as "*merker*" grass might be maintained and pit silage can be easily done.

(*e*) This part of the country is not blessed with many large landowners in the sense intended and little can be expected from this line. Cattle-shows are being encouraged but much education and demonstration of what can be done on the part of the Government are first required. There are a few of the more wealthy land-owning cultivators who already take a little practical interest and at least one case of a special bull on hire is known, but the present system of rearing cattle is all against improvement.

Oral Evidence.

64371. *The Chairman:* Mr. Robertson, you are Deputy Director of Agriculture, Myingyan Circle?—I was.

64390. Would you regard it as essential, if minor irrigation schemes

64373. Would you give the Commission quite shortly an account of your own training and past appointments, apart from those you have mentioned?—I am a B.Sc. of Edinburgh University. I came out to Burma in 1921. I was Deputy Director of the Irrawaddy Circle, that is, the delta area of Burma, until 1925 when I went on leave. After I returned from leave I was Deputy Director of the Myingyan Circle which I left in July of this year to come here.

64374. You are familiar, I think, with the dry tract?—I have had over a year of it.

64375. I understand that the introduction of groundnut in that area has had a very happy effect on the prosperity of the cultivators?—That is so.

64376. It has been suggested by one witness before the Commission that there are reasons to suppose that considerable difficulties may be met with in any attempt to improve the quality of the cotton grown in the dry tracts. Do you see any particular reason why research and propaganda should not effect an improvement in the quality of the cotton in the dry tract?—We have already effected improvement in the cotton of the dry tract, but we have not been able to spread it over a large area yet; that is to say, we have a superior strain of selected cotton for distribution. I do not know what the difficulty was which this gentleman particularly referred to, but the difficulty we found in getting the improved selected cotton spread rapidly over a large area was the climatic difficulty. We have extremely bad years when we scarcely get back as much seed as we gave out.

64377. Do you know of any tube wells in the dry tract?—No.

64378. Would it be a great advantage to the cultivator if it was found possible to sink tube wells?—Yes, I think so.

64379. You make an interesting contribution on the matter of demonstration in answer to Question 3 (*c*). You suggest the giving of a prize for the best holding. Have you ever tried that?—We have carried this out for two years now in the Myingyan Circle.

64380. Would you describe the effect?—I think it is too soon to describe any effect yet. I am, however, convinced that it has promise.

64381. It is essential to keep this thing up for a long series of seasons, is it not?—Yes. I also think that this is important in enhancing the status of the cultivators.

64382. At the end you suggest that when an improvement entails capital expenditure beyond the means of the cultivator it might be a good thing to assist in financing it. You mean Government assistance there?—Yes.

64383. Does that mean going outside the existing Acts?—I have said that we can manage it by means of land improvement loans.

64384. I wondered if you had in mind any further machinery?—I do not think that, in the dry zone, any other means would work very well.

64385. Here again the extreme uncertainty of the season is always a difficulty?—Yes.

64386. You suggest, in your answer to Question 8 (*a*) (*ii*), what you call the supervision of the construction of minor irrigation works. What do you mean by supervision?—Technical advice on the construction and repairs of small irrigation works, not strict supervision as regards construction: in other words: not attempting to do more than provide sound advice and to stimulate interest.

64387. There should be no absolute control?—I should not like to suggest that.

64388. Is it your view that there is a considerable opening for that class of work in certain tracts?—At present Government has been giving out quite a large amount, in land improvement loans, through the Agricultural Improvements Committee in the Meiktila district and I think that a lot of that money could be made better use of if they had the benefit of this technical advice.

64389. Is there a sound body of traditional practice amongst cultivators in the matter of construction?—It is very haphazard in my opinion. It is very difficult to get cultivators to combine together properly.

64390. Would you regard it as essential, if minor irrigation schemes of this sort are really to be pushed, that some officer should be made responsible for a time for touring about the districts?—Yes, that is my idea.

64391. And for helping the cultivators with advice?—Yes; at present the engineering officers have got all the work they can do.

64392. In your answer to Question 8 (*a*) (*iii*) are you suggesting another whole-time engineer to deal with tube-well irrigation?—No, it should be undertaken by the Agricultural Engineer.

64393. What have you found the attitude of the cultivator towards the department and towards sound advice to be?—I have found that the cultivator is ready to take up any improvement after he has been convinced that it is an improvement. I have not found any difficulty in working with the cultivator.

64394. In a precarious tract, I take it, the improvement must be substantial, otherwise it really does not attract the cultivator? Is that, broadly speaking, the principle?—I see your point there; the difficulty is one of really obtaining the improvement owing to the precariousness of the agriculture.

64395. If a particular improvement costs effort in terms of labour and money, both may be lost at the end of a bad season; and unless in the good season you can make up leeway to some considerable extent, over a series of years there may be no advantage from the cultivator's angle?—There are certain improvements which do not entail any increased labour or cost, such as our improved selection of cotton for instance. If he gets a good crop he commands a better price for it.

64396. In answer to Question 16 (*a*) (*iii*) you give us your opinion about the desirability of controlling the breeding of cattle so as to improve the strain. It is the case, I suppose, that in the meantime those who want good cattle have really no idea of selecting the parents at all?—There is practically no such idea at present.

64397. Do they pay as much attention to choosing the bull as they do to choosing the cow?—They do not pay much attention to choosing anything: very little indeed.

64398. Is any fodder other than straw stored in the lower area? Is there any grass for making hay?—They do make hay where grass is available.

64399. Is it nourishing?—Yes.

64400. But there is nothing in the way of growing fodder crops?—Yes; they grow *juari* (*Sorghum vulgare*, vernacular *pyaung*).

64401. *Juari* is grown as a fodder crop and is preserved?—In some parts it is grown entirely as a fodder crop; in other parts they grow it for the grain as well.

64402. Is it stored?—Yes; it lasts through the dry season and through part of the following rains.

64403. Is there any hope of the silo making any contribution to the fodder problem?—It can be done in the dry zone districts very easily by means of a pit silo. We did it at Mahlaing last year and the cattle enjoyed it very much indeed.

64404. Have you ever known a cultivator to dig a silo pit?—Never.

64405. *Sir Thomas Middleton:* You refer to the rapid spread of the *Theikpan* plough. Is it the reason that it so closely follows the model of the indigenous implement?—I do not think it is quite that reason; the reason is that we combine some of the advantages of the Western plough with a cheap frame.

64406. Is the draught lighter than the draught of the ordinary implement, or rather heavier?—It is not very much heavier; if anything, it might be a bit heavier.

64407. It is not a question of draught; it is a question of the efficiency of the work?—Yes; the efficiency of the work.

64408. To what depth does the indigenous plough work in this district: three or four inches?—Are you dealing with paddy land or dry land?

64409. I am dealing with dry land for growing millets?—Very often they do not use the plough at all.

64410. Do they not plough when the monsoon breaks?—No; very often they use the harrow. In some places they use ploughs, which go to a depth of four or five inches.

64411. In that case the *Theikpan* plough goes to the same depth, I suppose?—It goes a little bit deeper.

64412. Is there any crop which makes a demand for deep ploughing?—Cotton is one.

64413. Is it from the cotton districts that the demand for the new plough comes chiefly? Or does it come quite generally from all sides?—Generally from all sides.

64414. You seem to be badly placed in the matter of seed-drills. You refer to an improved seed-drill?—I shall show you one to-morrow; it is a simple implement made of wood and bamboo.

64415. Have you had any difficulty, in getting the cultivators to use this seed-drill?—There is one little difficulty in connection with seed-drills, and that is the seed-drill leaves a furrow, and if you get heavy rain, after sowing, as you frequently do in the dry zone, it fills the furrow up with soil and the seed does not come up. That is one great drawback; otherwise it has advantages every way.

64416. Is there no light harrow that can follow the drill?—I have been trying to evolve one, and I have succeeded in opening it up to a certain extent by cross-harrowing with an iron-toothed harrow.

64417. In this district are the plough-cattle mainly Burmese breeds?—Yes.

64418. Do you ever got them crossed with Indian cattle?—We do.

64419. Do you use the cross between the Indian bull and the Burmese cow as a plough-bull?—We do.

64420. Do you find any difference in working qualities between the cross-bred animal and the pure Burman?—Talking purely of cultivation purposes, I do not think the first crosses are good; I think when you get to about one-eighth it becomes debatable; but I do not think that we have experimented enough on that to give a definite opinion.

64421. Your own view is that you should select indigenous cattle?—We certainly should carry out selection on the indigenous breed, and we might also experiment separately with a little admixture of Indian blood.

64422. Do the Indian cattle have better milk producing qualities?—Yes, and they have greater size and weight.

64423. I am told that in Burma little or no importance is attached to milk and very little milk is drunk; does that mean that the calves get all the milk?—Practically all.

64424. It is an advantage which they do not have in India. Have you any idea of how much milk a Burmese cow produces? Have you made any tests?—About one to two *viss* a day. (A *viss* is 3.65 lb.)

64425. Bullocks are becoming much dearer, I am told?—Yes.

64426. With the increase in price have you seen any tendency to treat them better?—In my opinion the Burman has always been extremely careful of and good to his working bullocks. There is a wide distinction to be drawn between the working bullocks and the breeding cattle.

64427. The breeding cattle he leaves to themselves?—He leaves them more or less to themselves.

64428. Does he feed concentrated food regularly when they are in work?—He feeds a little groundnut and sesamum oil-cake.

64429. We have got estimates of the cost of maintaining plough-cattle from your department, and I see that in the busy season a certain amount of concentrates is fed?—Yes and also when there is no green grass.

64430. *Mr. Calvert:* Do you suggest that the local traders should take up the sale of improved implements?—I think that is a possibility after we have demonstrated their usefulness and effected a certain amount of distribution ourselves.

64431. In answer to a previous question you rather pinned your faith on co-operative societies?—That is for the purpose of getting our improved seeds distributed.

64432. You mention seeds and implements?—Yes; that would be one agency; but I do not see any reason why we should not have local traders as well.

64433. On what terms would the local traders come in?—They would require at least probably something like twenty-five per cent profit.

64434. What credit would they require from you?—I was not thinking of their getting credit from me; I was thinking of their getting credit from firms like Messrs. Charles Cowie & Co.

64435. You were thinking of big traders?—I was thinking of wholesale trade. Messrs. Charles Cowie & Co. will sell to the local traders and they will sell to the cultivators.

64436. Is there, at the present moment, any working system of improved implements being sold by local traders?—I cannot say; of course the ordinary Burmese plough is sold by local traders.

64437. Locally made ones?—Both locally made and imported ones. I mean the share which is stuck on to the front of the wooden frame.

64438. A large firm gives credit for three months only; the local traders require six months; that is the trouble in getting the implements sold by local traders?—They do sell these Burmese ploughs.

64439. Could you give us the details?—I could not.

64440. *Dr. Hyder:* With regard to the *Theikpan* plough, from whom does the cultivator buy now?—From the department.

64441. In answer to Question 12 (*i*) and (*ii*) you say: "There are matters under enquiry by the department which have not yet reached the stage of definite recommendations yet except in the case of *Theikpan* ploughs, line sowing, drill-sowing with use of seed-drill, inter-cultivating, and much can be done with these." Is there any chance of the department evolving definite implements for these operations?—These are all successes.

64442. These implements have been evolved by your department?—The seed-drill really originated from the department in India.

64443. Have you in mind any other implements which can be evolved after experimentation?—I have suggested in my answer to Question 14 (*a*), the following: an improved seed-drill, harrow or harrows; an implement for inter-cultivation, an implement for collecting cotton and *juar* roots, an implement for harvesting spreading groundnuts.

64444. You have not as yet constructed any implement with which these operations could be done?—We have evolved what, I think, is a satisfactory system for drill-sown cotton. We are using a blade-harrow between the rows and an iron-toothed harrow across the rows.

64445. Does the Burman use chaff-cutting machines?—He uses a lot of chaff-cutting machines in the dry zones.

64446. What are the improved implements which he uses?—None but those I have mentioned in answer to Question 14 (*a*).

64447. He is not conservative in regard to the use of machinery?—I do not think he is any more conservative than an agriculturist ought to be.

64448. *The Raja of Parlakimedi:* Is dry cultivation or dry farming, or cultivating their fields deep to preserve as much moisture as possible, a well-known practice among the Burmans in Upper Burma?—I am afraid that the dry zone is not really a dry zone for the purposes of dry farming; I do not agree to call it a dry zone; it suffers on occasion almost as much from excessive rainfall. We get thirty inches of rainfall in six months, but it is most irregularly and unevenly supplied, so that these dry farming ideas do not quite work out. Line sowing and inter-cultivating, of course, are on the lines of conserving moisture.

64449. Have they got special implements as we have got in India in similar areas?—They have a local plough and they have a wooden-toothed harrow; some cultivators have what we call a blade-harrow, and also a small wooden harrow which has two teeth for inter-cultivation.

64450. Do they have mixed cultivation?—They do.

64451. What do they usually grow together?—We have been trying to introduce the combined use of groundnut and pigeon pea.

64452. How do they usually sow?—They are accustomed to broadcast their mixtures.

64453. The seed-drill is not an indigenous implement?—No.

64454. It is newly introduced then?—Yes; it was introduced by the Agricultural Department.

64455. Do they attach any importance to the rotation of crops?—Yes.

64456. What do they grow after groundnut?—In the proper groundnut tracts I am afraid at present there is no rotation.

64457. Do they not grow millet or gram after groundnut?—Not in the *pucca* groundnut soils, where they grow the Burmese spreading variety of groundnut. They grow them almost continuously.

64458. The following year they cannot grow anything else except groundnut?—They could, but they do not choose to.

64459. *Professor Gangulee:* Is the work of your circle in any way hampered by lack of staff?—It has been up to date.

64460. For the work that you have in hand, how many men do you require?—There is a fixed establishment of two senior assistant agriculturists per district.

64461. In your view, they are not enough?—Below them I want a different type of man altogether. I want a practical cultivator, who has had a little training at our hands, to go and actually carry out the demonstration on the cultivators' holdings.

64462. What is your difficulty in getting such men?—The only difficulty so far has been money, more or less, but I think there should be permanent appointments, not temporary as at present.

64463. You told us that cultivators take to improved practices readily, if they are convinced that such practices are profitable. What are the agencies through which you distribute copper sulphate?—We have introduced it through our own agency up to now, but I hope to get beyond that.

64464. That is chiefly now in the hands of the department?—Yes.

64465. Not in the hands of the dealers?—I am hoping to do that. I have arranged for that with Messrs. E. M. Desouza & Co., Rangoon. On the packets we issue they put their name. I hope we may soon be able to have sales through private traders.

64466. Do you charge anything for the packet?—One anna. Messrs. E. M. Desouza & Co. supply them at nine pies.

64467. If you had an agricultural engineer in your circle, to what work would you put him?—I have not proposed having an agricultural engineer for my circle.

64468. Supposing you had an agricultural mechanic, or a man chiefly devoted to agricultural implement work, to what work would you put him?—I have suggested in my note the five implements which might be provided and improved. There is also the question of tube wells and other wells to be gone into.

64469. As carriers of disease and bringing in inferior breeds do you find that the importation of Indian cattle is a serious handicap to stock breeding in Burma?—With regard to disease, I do not think it is at all so. With regard to introducing inferior blood, it may become so. In certain localities it has already become a serious factor.

64470. We are told by the Deputy Director of the Eastern Central Circle that the uncontrolled importation of Indian cattle throughout the Province is to be regretted. Is that a problem in your circle?—Very little. It is only along the railways and near towns like Mandalay.

64471. I think your department has introduced Karachi gram in Upper Burma?—It has been a tremendous boon.

64472. *Mr. Calvert:* Is it Punjab gram?—It is known in the market as Karachi gram.

64473. *Professor Gangulee:* Is the cultivation of Karachi gram being extended?—Yes. The area under gram has more than doubled already.

64474. *U Ba Cho:* Up to a recent date you were in charge of the Myingyan circle?—Yes.

64475. Do the cultivators of that circle take any interest in the improvements effected by your department?—They do where we have been working, and, as I said, especially with regard to gram.

64476. Do they pay frequent visits to the farm?—The near-at-hand ones do. They come to us quite often, and we are on friendly terms with them.

64477. Have they organised a committee?—We have farmers' associations.

64478. Is that committee doing any good work?—I think it is.

64479. It has been stated by one of the irrigation officers that in certain areas there was a surplus of water in the canals, especially during the cold season and dry seasons, and he suggested that instead of the ordinary *kaukgyi* crops the *mayin* crops should be grown. Do you agree with that view?—I am sorry I have not had much experience of the irrigated territory. I understand that *mayin* is grown.

64480. Of course, *mayin* could be grown from the start of the cold season to the beginning of the hot season?—Yes.

64481. You said something about implements improved by your department. Could we see them to-morrow morning?—The Agricultural Engineer will have a display to-morrow morning, but these dry zone implements you will be able to see better at Mahlaing.

64482. In the Myingyan Circle the most important crop is cotton?—I would not say so.

64483. It is one of the important crops?—Yes.

64484. In your experience, do you find that the cultivators often have difficulty in getting seed for sowing?—I certainly think they do.

64485. Now that they are growing cotton on a large scale, they cannot get the seed except by purchase from the big ginners?—From the big ginneries, small local ginneries and brokers or traders.

64486. And they have to pay a pretty high price for their cotton seed?—Not when they get it from the big ginners, but from the local ginners and traders. The big ginner does not usually charge very high for the seed.

64487. Do you know the average price they have to pay for the seed from the millers or traders?—I think it is about five to seven rupees early in the season, and then it goes up to perhaps fifteen rupees later on.

64488. I have heard that it goes up to twenty-five rupees?—I think fifteen to seventeen is the highest.

64489. Do you know that some of the seed supplied by the traders or millers do not germinate?—Yes, it is sometimes extremely bad.

64490. The cultivator suffers on that score?—Yes.

64491. Do you not think that we should devise means by which the cultivators could be supplied with good cotton seed?—I certainly do. We are attempting to do that, but so far we have not made the progress we had hoped to make. I understood you were referring solely to germination. It is extremely bad.

64492. What I was driving at was this: Do you not think that the supply of good seed to the cultivators at a moderate price is a very important thing?—I thought you were referring to the germinating power as well as to the quality. The two are separate points. I agree with them both but they should be kept separate. The germinating power applies to the present supply of seed.

64493. Do you not think that if Government set up ginneries in important places, for example, Prome and Myingyan, and took the cotton from the cultivators and returned the seed to them, it would be a very good scheme?—It might be a very good scheme but I would not suggest that at present in Burma. There are more ginneries for cotton than there is cotton for them.

64494. Do these ginneries supply good seed to the cultivators?—They do not take the trouble. It will have to be paid for in some way. One complaint of the ginneries is that the cultivators do not come and take seed away early. If they took it away as soon as it was ginned, it would be much better. I suppose the difficulty there is financing. The cultivator cannot come and take it away early.

64495. Suppose Government come to the help of the cultivators, do you not think it would help matters?—Why not use the existing ginneries? I do not see the point of building more ginneries. What I think is that some rules or regulations might be made insisting on a certain standard of germination.

64496. The cultivators themselves cannot keep sufficient cotton to provide the seed?—They could if they wanted to but it means hand-ginning. That is rather a retrograde step. People would prefer to send it to the ginnery.

64497. *The Chairman:* Is there, in a bad year, a migration of labour in large numbers to reap paddy?—In a bad year there is.

64498. Do you think the railway is responsible for this migration?—Yes, partly; they go by river and by bullock cart too.

64499. Do you confirm the view that improved means of communication would facilitate the movement of labour from an area of surplus to an area of shortage and would contribute towards the solution of the economic difficulties?—The only lack at present is good roads. They are putting up a new railway just now from Myingyan across to the main line here through the dry zone.

(The witness withdrew.)

The Commission then adjourned till 10 *a.m. on Thursday, the* 10*th November,* 1927.

Thursday, November 10th, 1927.

MANDALAY.

PRESENT:

The MARQUESS OF LINLITHGOW, D.L. (*Chairman*).

Sir THOMAS MIDDLETON, K.B.E., C.B.
Sir JAMES MACKENNA, KT., C.I.E., I.C.S.
Mr. H. CALVERT, C.I.E., I.C.S.
Raja Sri KRISHNA CHANDRA GAJAPATI NARAYANA DEO of Parlakimedi.
Professor N. GANGULEE.
Dr. L. K. HYDER.
Mr. B. S. KAMAT.

Mr. H. O. REYNOLDS, I.C.S.
U. BA CHO. } (*Co-opted Members.*)

Mr. J. A. MADAN, I.C.S.
Mr. F. W. H. SMITH. } (*Joint Secretaries.*)

U SEIN, Manager, The Burma Provincial Co-operative Bank, Limited, Mandalay.

Replies to the Questionnaire.

QUESTION 22.—CO-OPERATION.—(*a*) (*i*) The Government should provide funds at a reasonable rate of interest, without which co-operation in Burma will never be successful. The present rate of interest of ten per cent charged by co-operative banks to societies (and fifteen per cent by societies to members) is excessive. This rate has accordingly in my opinion ruined the societies instead of giving help. No doubt, it is a cheap credit in comparison with *sabape* rates, *chetties'* rates and local money-lenders' rates. These rates will ruin cultivators quicker and fifteen per cent co-operative societies' rates will strangle cultivators by slow death. Perhaps, some people might argue that, during the olden days in Burma, people used to borrow at even fifty or sixty per cent. To a certain extent, that is correct. At that time, the people in Burma were self-supporting and contented people; they cultivated their small fields, they pounded their paddy, they collected fuel for their own use, they carried water by themselves, they planted *kapas* in Upper Burma, and they wove their own cloths. This I witnessed in Lower Burma also when I was a boy; they stitched their own coats or jackets. Owing to straightened circumstances if they were compelled to take advances from wealthier people they usually borrowed only small sums of Rs. 25, Rs. 50 or the most Rs. 100, at fifty or sixty per cent but they were able to repay it as the sums were small, and the repayment was also made quickly, and they had also no special calls for other expenses.

Owing to the present advanced civilisation with different kinds of modern luxuries, people have to divide labour and extend their business to keep pace with the advancement. When anybody is forced by circumstances to extend his business* he certainly requires a large amount of capital. The cultivators were then obliged to borrow from moneylenders at the usurious rates of interest of the present day, or to take advances on crops. This is the reason why many people have lost their lands and industries, and the *chettiars* have become landlords and mill-owners. Some luckier cultivators joined the co-operative societies with prospects of relieving pressure for a certain time, but the ultimate end at the present rate of interest is just the same as others. The co-operation of fifteen years ago

* No one can live according to the old standard. In this connection, I remember seeing one of His Excellency the Governor's speeches in the papers, saying that people should live according to the times.

was not the same as the present-day co-operation. Circumstances have changed a great deal. In Germany, where co-operation is undeniably successful, the rate of interest is three and a half or four per cent and the labourers and cultivators are much more skilful men than those of Burma. About fifteen years ago, the value of land in Upper Burma was Rs. 10 to Rs. 50, whereas the present value is Rs. 50 to Rs. 250. In Lower Burma also, the value of land per acre about fifteen years ago was Rs. 50 to Rs. 150; now the price has gone up to Rs. 250 to Rs. 350. Formerly, labour was cheap, the standard of living was not so high, the necessaries of life were quite cheap, and there were also not so much luxuries as at present. Towns-people who have capital have become rich at the expense of poor cultivators of the rural areas. An economic survey of society members will show that their earning capacity is not sufficient to pay even interest. A cultivator who invests his money for productive purpose can never get more than eight or nine per cent after deducting expenses; therefore, it is impossible for him to pay even interest. It can easily be ascertained by the fact that new societies could repay bank loans regularly for the first one or two years, and in the third year they found it rather difficult to pay even interest. When, however, there is a flood or failure of crops on account of scarcity or excess of rains, they lose heavily, with the result that they are not able to recoup that loss even in three or four years of successive good crops, because the capital sunk in productive purposes, unlike speculation, yields only a very small margin.

(*ii*) Propaganda work should be carried out by non-official agencies, but the control should be entirely in the hands of the Government.

(*b*) (*i*) Credit societies are not successful owing to high rate of interest, insufficient finance and lack of long-term loans; explanation can be given in detail if desired.

(*ii*) Purchase societies or consumer societies are not many in Burma. I think we should start among the members of credit societies of good standing after reformation.

(*iii*) Societies for sale of produce and stock would be successful if introduced in credit societies of good standing, after reformation, whose members are not in urgent necessity of disposing of their produce. At the same time, the societies should have godowns or granaries of their own to store their produce, *i.e.*, they should be built with their own money or from the intact reserve funds of credit societies, and not with borrowed money.

(*iv*) Societies for effecting improvements should be tried in the areas of irrigation. I have induced two societies to dig drains for irrigation and found it successful. As for making *bunds*, I think it is too expensive for co-operative societies to attempt: Perhaps, if a large number of villagers in the flooded areas can be induced to form a society, the scheme might be successful, but I do not think it is possible, as the people rely too much on Government to whom they all look to do the job.

(*v*) I have had no experience of this in Burma, but I have studied the subject during my visit to India in 1922. As far as I understand, it would not be of much use in Burma as there are very few fragmented holdings to be consolidated.

(*vi*) Societies for the co-operative use of agricultural machinery would be very advantageous provided such machinery can be purchased with their own money, and not with money borrowed from the banks. There are many reasons which can be explained, if desired.

(*vii*) It is too early for joint farming in Burma. This should be introduced when co-operation is successfully established. The question of unity is the most difficult problem. This is the reason why I suggest introduction when co-operation is successfully established.

(*viii*) The idea of cattle breeding in Burma is very good, but progress is retarded for want of sufficient capital and owing to religious obstacles. I understand there is no hindrance to a slaughter-house licensee buying cattle from the breeding farm, although the original idea is to breed plough-cattle.

(*ix*) I think societies for cottage industries should be introduced among the housewives of rural areas, and exhibitions of their handicraft should be held once a year at the district headquarters.

(*c*) I think a trial should be given by forming societies to make improvements in rural life before introducing legislation.

(*d*) No. I do not think any of the agricultural credit societies are really successful.

QUESTION 23.—GENERAL EDUCATION.—(*b*) (*i*) I would suggest that the following subjects be introduced in village lay schools:—

(*a*) A subject on scientific agriculture, with occasional practical training and demonstration;

(*b*) a subject on co-operation; and

(*c*) to teach thrift among the school children by introducing a system of savings bank collections out of their pocket money. (The youth of to-day are the nation of to-morrow.)

(*ii*) I prefer legislation for compulsory education in rural areas, although it may be faced with some difficulties at the start. Only proper education will reduce crime.

(*iii*) The reasons for the small proportion of boys in rural primary schools who pass through the fourth class are the poverty of their parents who cannot afford to keep their sons at school, although free education is given, because parents want their children to help them in their daily labour, and also they do not realise the advantages of higher education. Parents think some knowledge of reading and writing is quite sufficient for rural life.

QUESTION 24.—ATTRACTING CAPITAL.—(*a*) I do not think it is advisable to allow capitalists to take to agriculture because, if they are allowed to do so, in course of time the *bona fide* cultivators will be extinguished, the small cultivators will become only landless tenants. The capital required should be given freely by the Government as in the case of some foreign countries. We have heard of many instances in which *bona fide* cultivators are nothing but labourers to capitalists. We should not lose sight of the troubles arising out of the feudal system which have prevailed throughout Europe from the eighth century to modern times. It remained in Russia until 1861, and its last vestiges were not stamped out in Germany until 1851.

In Great Britain and Ireland the Small Holdings and Allotments Act of 1908 had to be passed so as to enable the Government of Great Britain to take land which any individual owns in England and Wales in excess of 50 acres, and to sell or lease it to a farmer or labourer.

In Burma, although there are many plots of waste lands, yet there are also many cultivators landless for want of capital. If capitalists were allowed to take to agriculture there would be not a part or parcel of land in course of time for *bona fide* cultivators. Perhaps one might argue that it would take a long time for *bona fide* cultivators to work all the waste land, but with the development in agricultural enterprise and the prospects of improvements in the co-operative system to give reasonably cheap credit, the landless cultivators may be encouraged to work all waste lands. I think it is only a question of time; it must come one day.

(*b*) Factors tending to discourage owners of agricultural land from carrying out improvements are due to lack of capital.

QUESTION 25.—WELFARE OF RURAL POPULATION.—(*a*) I do not think any improvement in hygiene can be made with the present state of villages in Burma, which are without drains and where the cattle are kept near or underneath the houses. However, I would suggest the encouragement of the homestead system by which improvements can be made in many ways; they are as follows:—

(*i*) By staying near his cultivation a man can attend his cultivation more frequently than when living in the village, thereby getting better crops.

(*ii*) By staying near his cultivation, the fertility of the soil can be greatly improved as his cattle will be tended in his fields after harvest.

(*iii*) By keeping the cattle at the farmstead there will not be much cattle disease. Even when there is any epidemic disease in other farmsteads, there is very little chance of it spreading, as cattle will be kept in their respective farmsteads.

(*iv*) By staying near the cultivation, he will have free ventilation, his surroundings will be more hygienic, and in consequence he and his family will be more healthy.

(*v*) By staying aloof from other villagers he will take care of himself by not keeping his money or jewellery with him, and there will be a great decline in crime, which is more important. As long as there is no bait, no dacoits will attempt to commit crime.

(*vi*) Last, but not least, when a man lives outside the village by himself, he will surely find a safe place to keep his valuable belongings, he would not be encouraged to buy more jewels, and he would also incline to dispose of the jewels which he had already got. To keep his cash and valuable property safe he will readily find a place in village co-operative banks, central co-operative banks, the Provincial Co-operative Bank, joint stock or exchange banks—by which the bulk of the nation's wealth will be in a place of depository from where it can be utilised profitably for the nation's welfare. In this connection, I would state that there is a great deal of surplus money lying idle in the ground, in safes, in boxes, in the pockets of many people and in bamboo holes. This farmstead, or homestead, system is the only means to get the money invested in banks, and also to reduce crime.

(*b*) Certainly I am in favour of conducting economic surveys in typical villages, and in fact, it is my long-cherished desire. Without this, the Government can never realise the hardships undergone by the villagers who are in the grip of moneylenders. The scope and methods of such enquiries should, I think, be as follows:—

The enquiry committee should visit prosperous villages, as well as middle class and poor villages.

The enquiry committee should enquire into the earning capacity of a village family, consisting of husband, wife and two children (say a son about 17 years of age and a daughter of 10 or 12 years) who can give material assistance to their parents.

Indebtedness and its cause should also be enquired into.

What were the landed properties their forefathers left for them, and whether the lands were mortgaged to others by their forefathers, and if so, how much and what is the present indebtedness?

If there is any increase in debt, and if so, the reasons why?

Whether their forefathers' debt had been liquidated, and if so, with what source of income the present family has done so?

Are there any extra lands bought or waste lands cleared and leases obtained? Where do they get capital? If they borrow from others, whether they are able to repay the loan? And at what rate of interest?

What is their earning capacity after deducting necessary expenses?

The formula would be to ascertain the acreage that a family consisting of husband aged 40 years, wife aged 37 years, a son aged 17 years and a daughter aged 12 years, can cultivate.

Whether the land the family cultivate is free from encumbrances? If not what interest they are paying?

Whether they have a sufficient number of plough-cattle? If not, what would be the hiring charges? If they buy them by borrowing from others, what interest they are paying?

The amount required for buying seed-grains.

The amount required for expenses in cultivating the lands.

The amount required for food for a whole year.

The amount required for clothing for the family for one year.

The amount required for miscellaneous unavoidable expenses, such as subscriptions to charity and funerals, for one year.

The amount required to pay land tax and water tax if there is any.

The amount of interest to be paid on borrowed money.

Earnings.—Sale-proceeds of produce.

Subsidiary earnings, such as cart-hire, sale-proceeds of hay, sale-proceeds of products of cottage industries, if there is any.

I think an enquiry should also be made with regard to a family who work entirely on borrowed capital.

(c) I have made several enquiries and found that the largest earning of a family after deducting expenses is about Rs. 20 or Rs. 30, which is not sufficient even to pay interest at fifteen per cent for the loans taken for food, seed-grains and cultivation expenses only. If the family has to borrow money for the purchase of cattle or land there is no chance of being able to pay interest at any rate more than five per cent. In this connection, I would mention here that political economists like Adam Smith and Jean Sismondi contended that capital sunk in the purchase of real estate can never be recovered because its returns are sufficient to pay only the interest at the lowest rates.

Oral Evidence.

64500. *The Chairman :* U Sein, you are Manager, of the Burma Provincial Co-operative Bank, Limited, Mandalay?—Yes.

64501. We have a note of your evidence. Do you wish to add anything or make any corrections at this stage?—I would like to press for State aid.

64502. In what form exactly?—In the form of lending money to the society through the co-operative banks.

64503. *Mr. Calvert :* Government money, is it?—Yes, at a rate of not more than five per cent.

64504. *The Chairman :* Will the public or the commercial concerns lend at that rate?—The average bank rate is five per cent.

64505. Do you think the security of the co-operative movement is as good as the security offered by the banks?—The unlimited liability of the members and the earning capacity of the members are quite valuable.

64506. Will the public lend their money to a co-operative bank at five per cent?—The public have not got the money to lend to the societies.

64507. What you wish is that the tax-payer should subsidise the co-operative movement to an extent equal to the difference between what the public will lend at and five per cent?—Not exactly that. I understand that the Government of Burma are in a position to obtain loans from the Government of India at four per cent. If we can obtain such loans from the Government of India we can finance the societies at the rate of five per cent. I would submit that it is the duty of every Government to see to the welfare of the people. Agriculturists form the mass of the people in this country. I would therefore suggest State aid at a reasonable rate of interest for a lengthy period; this has been done in every country by their respective Governments. I can produce many authorities. I would also like to state that cultivators of Burma, unlike those of other Provinces in India, had over nine crores in rice control profit on which the agriculturists in Burma have some claim, but I am sorry to say that they have no direct benefit out of this big sum.

64508. What is the capital of your bank?—Over six lakhs.

64509. Paid up?—Yes.

64510. Is there share capital?—Yes.

64511. Debenture capital?—No debentures.

64512. How many directors have you?—Twelve altogether in Mandalay and two in Rangoon.

64513. Will you tell us, quite shortly, what are their professions?—Most of them are rice millers, some are jewellers; one is running a press. They are business men.

64514. What are you yourself?—I am the Manager of the bank.

64515. That is a whole-time salaried post?—Yes.

64516. Will you tell us how your bank operates? Do you ever lend money to individual cultivators?—No.

64517. Only to primary societies?—Yes.

64518. Do you examine the claims of members of primary societies for loans, or do you leave that to the primary society?—We leave that to the primary societies entirely. In fact we are guided by the maximum borrowing limit fixed by the officers of the department.

64519. To what extent do you examine the working of the primary societies?—In fact we have got nothing for our guidance except that a few years ago we had audit abstracts from the societies. These abstracts are not very reliable because the assets of the members are never verified.

64520. Do not you find it very difficult to decide whether a society is deserving of a loan unless you have some means of knowing how that society is conducted?—We are solely guided by the officers of our department who fix a maximum borrowing limit. They are the inspecting authorities of the societies.

64521. Do you find that the advice given you by the department is, as a rule, sound?—Yes; of course we cannot judge from the present state of the societies. The societies were quite all right; their credit was good; but owing to successive failures of crops and the increase in the standard of living about seven years ago the societies have come into bad times especially in the dry tracts of Upper Burma, and they are not able even to pay the interest.

64522. Have you had to write off any of the loans?—Yes, a pretty big sum in the case of a co-operative ginning society; besides that we have had to create an interest compounded reserve to which we transfer all our profits and a certain amount from our general reserve. The interest compounded reserve is now over six lakhs. I have sent my report to be printed, but it is not read yet.

64523. Are many societies in arrears?—Many, mostly from upper Burma.

64524. Can you give us an indication of the total of your arrears?—Of loans?

64525. Yes?—About thirty lakhs.

64526. How much have you out altogether?—Altogether about eighty-five lakhs.

64527. That is a high percentage. Do you think the movement is making any headway now; or is it going back?—It is going back.

64528. Do you anticipate a financial crisis?—I do.

64529. How soon do you think it will come?—Next year, unless Government give us some help. The interest due last year was eight lakhs, out of which we recovered only four lakhs.

64530. That is apart from the arrears of loans?—Yes, apart from the arrears of loans.

64531. Have Europeans placed any deposits with you?—Yes.

64532. To what extent?—About fifty-seven or sixty per cent.

64533. What class of Europeans?—Mostly Government servants.

64534. Are you familiar with the history of co-operation in other Provinces of India?—You mean, have I studied the history of co-operation in India?

64535. Yes?—I have.

64536. Do you know whether there is any difficulty in raising the necessary capital from the public in other Provinces in India?—There is, but Madras has been greatly favoured by having deposits from the local bodies.

64537. If your proposal were followed the greater part of the capital would come from Government?—Yes; it would come from Government.

64538. Do you think you can maintain the co-operative spirit if you depend upon Government to that extent?—Of course it is against the

co-operative principle, but in the present circumstances of the co-operative societies in Burma, I think we must have State aid; otherwise the movement will be a failure. State aid was freely given in other countries by their respective Government.

64539. Let us have it quite clear once again. You pay your depositors at what rate?—Seven-and-a-half per cent.

64540. At what rate do you lend to primary societies?—The bank lends to the societies at ten per cent. And the societies lend to members at fifteen per cent.

64541. Who carries out your audit?—The bank's accounts are audited by chartered accountants.

64542. Are you satisfied that it is impossible for you to reduce the margin of five per cent on which you operate?—Our margin is not five per cent; our margin is the difference between seven-and-a-half per cent and ten per cent, that is, two-and-a-half per cent. We have to provide liquid assets for which we have to invest a large sum of money in Government securities at an average rate of four-and-a-half per cent; this provision of fluid resources reduces our margin of profit also.

64543. And the primary societies get a margin of five per cent?—Yes.

64544. Do you not think that that is too high?—Provided the societies can get the interest from their members regularly, it is very high. But as they are not getting it regularly and at the same time there are so many calls on the societies (for instance, the societies have to pay the audit fees, pay towards the maintenance of the union inspectors, the district association and so on) I think that five per cent is not too much.

64545. Do you attribute the troubles of the co-operative movement to any particular cause?—I have given my reason in answer to Question 22 (*a*) (*i*). "Owing to the present advanced civilisation with different kinds of modern luxuries, people have to divide labour and extend their business to keep pace with the advancement." They want a larger amount of capital to extend their business, and they are unable to pay the higher rate of interest charged.

64546. Do you think any part of the trouble has been due to the early removal of official advice and surveillance?—I do.

64547. In answer to Question 22 (*b*) (*iii*), you suggest that credit societies should undertake the business of selling produce and stock. Do you see any danger in combining the two functions in one society?—None, because even at present some societies, although they are not registered as sales societies, are conducting both businesses, and they are thriving very well.

64548. Do you mean combining the two businesses in one society; would you keep your accounts separate?—Yes. There is no danger in selling their produce collectively. This is not speculation.

64549. You would not ask your credit society members, as such, to take any share in the risks of trading?—I would not suggest that.

64550. Have you read of the better-farming and better-living societies in the Punjab?—I have studied the subject while I was touring in India.

64551. You think there is some hope for that movement in Burma?—Yes, if we can get the Agricultural Department to co-operate with us.

64552. Do some of your members of primary societies borrow both from the primary societies and the moneylenders?—They do, because when there is failure of crops they cannot repay bank loans and the bank refuses to issue fresh loans. They are then obliged to borrow from outside moneylenders.

64553. At what rate do they borrow money from the moneylenders?—Between thirty-six and sixty per cent.

64554. As against fifteen per cent from the society?—Yes.

64555. If they are unable to borrow at a profit at fifteen per cent, that is to say, if their agricultural operations are handicapped by being financed at fifteen per cent, how comes it that they can afford to borrow at thirty and fifty per cent?—Necessity forces them. In fact, they are no more than slaves. They are in the hands of the moneylenders, and although the

moneylenders realise that they will never be able to repay the loans with interest, still they finance them knowing that they will get all there is.

64556. You estimate the net return on capital invested in agriculture at about nine per cent?—Eight or nine per cent.

64557. How do you come by these figures?—When we go round to the societies we make economic surveys of the societies, and we find that in the case of each family the excess of income over expenditure is about eight or nine per cent. Not only I, but other co-operative officers also have made these enquiries, economic surveys of the society's members, and they have found the same thing.

64558. Are you giving there full value for the man's own labour and for his children's labour?—Everything is included. I even allow for their subsidiary earnings when they do other work out of the season.

64559. And have you deducted taxation?—Yes. If you will allow me, I should like to put in my note * on co-operative finance in Burma.

64560. *Sir Thomas Middleton:* Your economic enquiries have satisfied you that a cultivator cannot afford to pay more than nine per cent?—Yes, nine per cent is their net profit.

64561. This means that, in order to carry on business in the way in which you are conducting it now, your bank working on a basis of two and a half per cent profit, and the societies working on a basis of five per cent, you would have to be able to borrow at three-and-a-half or four per cent?—Unless the bank can borrow at three-and-a-half or four per cent, the societies cannot work.

64562. Does not this deduction from your economic enquiry suggest that your figure of nine per cent must be wrong, because the whole experience of Burma shows that the cultivator has been borrowing at much higher rates, and has been able to repay?—I do not think that they can pay any higher rate. That is the reason why the cultivator has now become a landless tenant.

64563. We have been told that he has been paying to the *chetty* at least twenty-four per cent?—This is the reason why there is such a big indebtedness in the Province.

64564. Do you know what the indebtedness in Upper Burma is? Is it serious as compared with the Indian Provinces?—It is serious. I do not know much about Indian Provinces.

64565. Are eighty per cent of your people seriously indebted?—Perhaps more. In fact, the small owners of land have now become landless tenants. That shows that they are in a bad way on account of the high rate of interest at which they have to borrow from the moneylenders.

64566. I want to get from you your opinion as to the extent of serious indebtedness. Do you think that four out of every five persons are seriously indebted in Upper Burma?—I think so among agriculturists.

64567. What means have you of forming an estimate?—I have been meeting most of these cultivators, and when I make enquiries of them they make the same complaint.

64568. The evidence we have so far had is that there is not serious indebtedness to anything like the extent which you indicate?—Is that the evidence of people who are really in touch with the poor class of cultivators?

64569. Has the debt position become much worse in the last ten years?—Certainly.

64570. I have seen it stated somewhere that, relatively, the cultivators of Upper Burma have been doing pretty well in the last ten years, owing to the extension of the growing of groundnut, which has brought in a large amount of money?—That is only in Pakokku district. There is great relief in that district, I admit, but not in other districts.

64571. Has not the price of sesamum seed gone up very much?—It has gone up from Rs. 7 to Rs. 13 and Rs. 17.

64572. Is not that a very great assistance to the cultivators in Upper Burma?—But they have got other calls on their purse from other sides.

* Not printed.

64573. Your evidence shows that you are fully aware of the necessity of getting down the rate of interest. You yourselves cannot work on a less margin than two-and-a-half per cent?—No; we ought to work on three per cent.

64574. The primary societies allow themselves a margin of five per cent. What do they do for that five per cent? Is the five per cent intended to cover risk of bad debt? Does it pay for inspection? What does it pay for? —There are so many calls on the society. They have to contribute to the Burma Co-operative Council.

64575. How much?—About ten years ago, the societies had to contribute about Rs. 20. Now they have to contribute Rs. 100. There are so many other calls on them. It is due to relaxation of Government control.

64576. If you state that contribution in terms of percentage, is it not very small?—I think it comes to about three per cent.

64577. Is it as much as three per cent?—Yes, including audit fees and other things. It affects, a great deal, societies with small working capital.

64578. If these expenses amount to three per cent, the balance of two per cent must cover risks?—Yes, but, as I have stated in my written evidence, the members of the societies cannot pay fifteen per cent interest, and the societies are not allowed to take this unrealised profit as profit.

64579. You prove that two per cent to cover risks is much too small a figure?—Yes, especially when the members cannot pay fifteen per cent.

64580. *Mr. Calvert:* In your written note you propose that Government should provide you with funds. To what extent, do you think, should Government provide funds?—Seventy-five per cent.

64581. Seventy-five per cent of the working capital of the societies?—Yes, on borrowed capital.

64582. Would you make it a very lengthy period, or would you pay it in a definite number of years?—That depends on the formation of the Land Mortgage Bank. If the Land Mortgage Bank is not going to be established soon we want it for a longer period, say, about thirty years.

64583. You think that Government would have to provide seventy-five per cent of the working capital for about thirty years?—Yes, seventy-five per cent of borrowed capital.

64584. You give figures showing the great rise in the value of land?—Yes.

64585. You also mention the rise in the standard of living?—Yes.

64586. This rise in the value of land has increased the credit of the people?—Certainly; their credit has increased.

64587. And they are using that credit to borrow?—Yes, because they must have bigger capital to extend their business to keep pace with the advancement.

64588. And they are using their borrowings to raise their standard of living?—Not only for that; they have to buy seeds, agricultural implements and other things. Things are rather expensive now. Cultivators cannot afford to spend their earnings on luxuries; the necessaries of life are too dear.

64589. But you think that the rise in the price of land has something to do with the increased borrowings?—Yes.

64590. Would you say that the members of your primary societies are well educated in the principles of co-operation?—Yes, I think so.

64591. Taking that famous paragraph 3 of the Maclagan Committee's report, do they understand it?—I should say most of them understand it. They are not lagging behind in education. Almost every member knows the main points on co-operation.

64592. Do you say that your members are willing to repay if they have the money?—They are.

64593. The fact that they do not pay is not due to lack of willingness, but lack of ability?—Yes.

64594. Who, do you think, should be responsible for the education of members of primary societies?—Both officials and non-officials, mostly non-officials. In fact co-operation is not an established subject. I say the policy ought to be revised at least once in three years, according to time and circumstances, but we have not done so.

64595. Who should conduct the education of your members; Government or non-official unions?—Government has done it. The education that they got previously was through Government agency, but it is now being spread by non-officials also.

64596. Do you think the non-payment of loans indicates any weakness of character in your members?—No, certainly not. I should not think so.

64597. You take sureties from individual borrowers. Are these sureties ready to repay?—When there is no income, they cannot pay.

64598. You told the Chairman that one of the reasons why people were not repaying was a succession of bad seasons. Are you not aware of the ordinary banking experience that you borrow in time of prosperity and repay when times are bad?—I do not follow you.

64599. The point is this: When there is a boom in trade, the bank rate goes up and when there is slackness, it goes down. Do you not get the same thing here?—No. It is not applicable to members of co-operative societies; they have no spare money like capitalists.

64600. I think you told the Chairman that your bank lends out to primary societies. Are there no central banks between you and the primary societies?—In certain places we have them.

64601. Are the moneylenders working against the co-operative movement here?—No. We cannot expand our business to a large extent and that is why it does not affect the moneylenders.

64602. The moneylenders do not regard the co-operative movement as a serious danger to them?—Not at present.

64603. Have you, in your bank, much money deposited by primary societies?—No.

64604. You would like the State to deposit money with you in order to bring down the rate of interest?—That is the idea.

64605. Which do you think is a better method—that interest should be reduced by the State advancing money or that interest should be reduced by the societies accumulating shares and reserves of their own?—What I should like to propose is that the reserve should be kept intact and not utilised for working capital. The Maclagan Committee recommended that reserve fund can be utilised in working capital. The societies took advantage of that and they used the reserve in their working capital but they overlooked a proviso there which said "provided societies have sufficient liquid reserves." Now, they have no liquid assets. Formerly the practice was that all the reserve funds of primary societies to be deposited with the banks. Had they done so, most of the societies would have been independent. Their deposits would have covered their borrowings. At present they have got none. There should be some rules for compulsory saving for the society.

64606. You have a compulsory saving by way of your shares?—They are all utilised in their working capital. That is no use.

64607. What rate of interest would be necessary in order to attract local deposits?—At present the rate is four-and-a-half per cent.

64608. Are you getting sufficient deposits to meet all your requirements at four-and-a-half per cent?—At present there is no expansion in the co-operative movement. At one time I carried a surplus of about thirty lakhs. I had to reduce the rate. I have had to refuse fixed deposits.

64609. You can get local money at four-and-a-half per cent?—Yes for one year. Formerly we offered as much as eight per cent for three years and we are carrying fifty lakhs of that money still.

64610. If you can get money at four-and-a-half per cent, why should Government advance the money?—We can get only a small amount at that rate, about three or four lakhs. In course of time I expect to get all our requirements even at three per cent and two-and-a-half per cent on current account. It will be dangerous for the co-operative bank to carry large amounts of short-term deposits or money at call.

64611. In your new Act you have a new section whereby the contributions fixed by the liquidator can be recovered as arrears of land revenue?—That is only when the Registrar thinks that such a step should be taken. The liquidator, so far as I know, has no power to force that unless he can get the consent of the Registrar.

64612. The Act gives the liquidator power?—Yes, with the approval of the Registrar.

64613. Was that new clause put into the Act because, without it, the liquidator could not recover the sums due?—Not only that. In ordinary civil cases, in executing decrees, it takes a long time to recover money. In fact liquidation has been dragging on for six or seven years.

64614. Is that long liquidation due to the laziness or the incompetence of the liquidator?—Formerly the liquidators were selected from the elders of societies and lawyers and they did not take much interest. We then had to appoint paid liquidators. They took some interest but they were not so useful. We are now taking another course. We are appointing junior Assistant Registrars as liquidators and we are getting our money back in that way.

64615. First you had non-official liquidators and they could not recover the money?—No.

64616. You then amended the Act so as to enable the liquidator to apply to the Deputy Commissioner to help him and you are now employing official liquidators?—Yes.

64617. Do you have, in Upper Burma, any co-operative conferences?—We have.

64618. Are they district, township or provincial conferences?—We have district as well as provincial meetings. Formerly we used to have a conference for the whole Province once in two years. Now, we are having them once in four years; this is what I have heard unofficially.

64619. When do you have your district conference?—Once a year.

64620. In your district conferences, is the question of standing arrears discussed?—We had no chance of attending it. I do not think the subject was ever discussed.

64621. I think you went to the Punjab and when you came back you wrote a report. In that report the only criticism you made was that there was too much official supervision. What is your opinion now?—It is better. I have changed my idea.

64622. *Dr. Hyder:* Who pays the salaries of the official liquidators?—They are paid by the Government.

64623. The societies do not have to pay the amount?—No.

64624. Are they salaried servants of Government?—Yes.

64625. *The Raja of Parlakimedi:* In your note you say that the present financial condition of the village is very much lower than what it used to be. Apart from lending money, may I know in what other ways your societies have been trying to ameliorate the condition of the people?—According to the co-operative principle they try to improve the condition in many ways. They do their best for the uplift of the people.

64626. Will you mention some of them?—They do some sort of collective savings. Every member has to put all his produce after harvest into the godown.

64627. Are they doing that?—Yes but unluckily in one case about eight years ago they tried to do it but they did not have a godown. They put all their paddy in an open space and unluckily we had early rains and all the paddy was spoiled and they had to sell their paddy at a very low rate. They were demoralised. With regard to this, as far as I know, the Government of Madras made an advance of one lakh of rupees to build godowns, and that advance was to be repayable in thirty years at the rate of five or six per cent. Without a godown no wholesale society can be carried on successfully.

64628. But in your case you have such a surplus amount that if you would only lend it to these societies at a reasonable rate of interest in order to enable them to build godowns for storing paddy and sell it in the proper seasons, would that not be a good thing?—Yes, but it must be a

long-term loan repayable in ten years; the shortest period should be ten years. The bank cannot afford to issue these loans and make them repayable in ten years because our fixed deposits extend over a period of four years and that is the longest period with us.

64629. Cannot you extend the loan over periods of four years? You can lend the money in the first instance for four years, and then after that period is reached a further application is made and you extend the period over another four years. Does not the Act allow you to extend the loan in that manner?—We cannot possibly take that risk because the bank will be liable to be called upon for the return of the deposits at the expiry of four years, and if we cannot get the money back from the society we will naturally be faced with very great difficulties.

64630. Have you approached the Government for funds for this work?—Only three months ago I saw something about Government rendering help in Madras, and I at once wrote to the Registrar suggesting that the same proposal might be adopted here, but I have not yet received any reply.

64631. How long ago was that?—It was recently, and my impression is that action is being taken.

64632. If this money were available, how many storage places would you be able to start?—As a matter of fact I have received an application from one of the unions asking for a loan of Rs. 1,000 to build a godown. This union has over 6,000 baskets of paddy to be stored, and the applicant is one of the witnesses to be examined before this Commission.

64633. Have you included a good many such storage places in your estimate?—Taking the present position of the societies into consideration I do not think there will be many, because they are rather in a bad way especially in Upper Burma. Most of them are bad societies so that they cannot build godowns.

64634. Have you been interesting yourself in any way in improving indigenous cultivation, for example, making artificial manures available to the various societies, or giving them improved strains of seed?—We have not got the time for this; we confine all our energies to financing the societies. Occasionally, when I visit the societies, I offer them advice as to how to approach the Agricultural Department with a view to getting better seeds and information about better methods.

64635. In another place you say that the people expect everything to be done by the Government. Why is that the case?—It is so, simply because it is hereditary with them.

64636. Because this used to be the case in the olden days, I take it?—Yes.

64637. You suggest that compulsory education should be enforced. Do you think that the country is ready to bear this burden?—If you mean that there will be any extra expenditure involved in imposing compulsory education, then I would say that I do not think so. In every village they have got a monastery and if the people simply send their children to the monastery that in itself would be quite sufficient. As a matter of fact the Burman is not very far behind in the matter of literacy; there are very few illiterate people. What we want really is modern education as explained in my answer to Question 23 (*b*) (*i*).

64638. You want it to be given in the shape of free education?—Yes.

64639. *Sir James MacKenna:* What is the cash position of the bank at the present time?—I think it is quite sound, because we have got sufficient fluid resources to go on with for one year more in case we do not get any repayments from the societies for that period.

64640. And no repayment at all is a very gloomy view to take, is that not so?—Yes.

64641. Is the bank taking any steps to improve the present position?—The bank has sent a long report to the Government making certain suggestions towards improvement.

64642. Was it to the effect that Government should lend them some money?—Of course the Government should grant the loans on the recommendation of the Government officers, because the bank has been working in the dark. Except repayment we have not got anything for our

guidance. We have to rely on Government for the maximum borrowing limit fixed. I do not think that the Government officers will fix the maximum borrowing limit without first knowing the credit-worthiness of each society.

64643. Your view is that, as loans to primary societies or to district banks are made on the authority of the Registrar who is a Government official, Government is liable?—Yes, but the cash credits for district banks are fixed by the Provincial Bank.

64644. In the case of the primary societies the borrowing power or limit is fixed by the Government official?—Yes.

64645. *Professor Gangulee:* You have a system of guaranteeing unions?—Yes.

64646. How is that system working?—I am not quite satisfied with the guaranteeing union system.

64647. What is your criticism?—So long as the members' pockets are not touched they do not care much, that is to say, so long as the liability devolves on the society, the members do not care.

64648. Would you like to see that system abolished?—I think it would be much better to abolish it.

64649. You have a committee of management in each primary credit society?—Yes.

64650. Could you tell the Commission how these committees are working?—At certain times of the year they have to prepare forecasts; in those forecasts they have to enter the earning capacity, the amount of loan that is estimated to be repaid and the amount of requirement for the next year. All these have to be put up before their committee and then a decision is made. Then the union forecasts are sent to the Government officer for sanction. After he has satisfied himself as to the requirements, this officer fixes the maximum borrowing limit. He sends four copies, one to the bank, one to the union, one to the society and one to the Assistant Registrar in charge.

64651. Who sanctions the loans to individual members?—The Committee of Management.

64652. In your view, these committees take sufficient interest in the primary societies, I take it?—I think so.

64653. If that is the case, why do you say in reply to Question 22 (*d*), that you do not think that any of the agricultural credit societies are really successful?—In reality they are not successful. The fact of the matter is that they are not indifferent but when the members cannot pay their interest the society naturally will not be successful.

64654. What are the difficulties?—The difficulty there is that their income is not sufficient to pay the interest. Any payment of interest or principal must be made out of a return from the soil; so when the return from sales is not sufficient to enable them to pay the principal and interest, the society naturally cannot be successful.

64655. You suggest that propaganda work should be carried out by non-official agencies?—Yes.

64656. Have you any such non-official agencies in Upper Burma?—Yes, we have honorary organisers.

64657. What propaganda do they carry on?—Mostly propaganda for the formation of societies and sometimes they preach better farming methods, education and better living. But I submit that no amount of preaching will be of any use unless there is sufficient capital to work with and get a profit.

64658. When you say that propaganda work should be carried on by non-official agency but that control should be in the hands of Government, what is it that you mean by control? What control do you desire?—Strict supervision in every respect.

64659. Strict supervision of the work of the honorary organiser?—Supervision over the societies.

64660. I see that you are in favour of such investigations?—Yes.

64661. You have visited the Punjab?—Yes.

64662. Have you acquainted yourself with the Punjab Board of Economic Inquiry?—Yes, I am familiar with it.

64663. What agencies would you employ for such inquiries; non-official or official?—I think a mixed committee will be best, because we cannot dispense with the non-official bodies.

64664. You yourself, I understand from your replies to Question 25 (*c*), have made several inquiries. Have you published any of your inquiries?—I have not published them, but I posted a copy to the officers of the department for their information. We are allowed to inspect the societies as a matter of grace only. According to the Act we are not allowed to have access to the books of the societies, so we can only give them advice.

64665. What was the nature of the inquiries which you undertook?—Inquiries into the economic position of the society members. I reported the result of my inquiries to the Registrar.

64666. You found that the largest earning of a family was about twenty to thirty rupees. Is that an annual figure or a monthly figure?—That is an annual figure.

64667. You are in favour of the homestead system; what are the difficulties in the way of encouraging that system in Burma?—We have the village fence system; people are not allowed to live outside the village fence. That is a great hindrance now.

64668. You think it is necessary for administrative purposes?—I do not think so; it is Government who think so. There will no doubt be some difficulty at first as in all other cases newly introduced, but these difficulties will be overcome in time and the subsequent result would be excellent. We must not be afraid of the difficulty to begin with, which will be nothing in comparison with the subsequent benefit to be obtained.

64669. Are you aware of the preponderance of crime in this Province?—If a man is treated as a child and put in an enclosure, he thinks it safe to keep valuable things with him, and that attracts dacoits; if he lives outside he will use his commonsense and he will not keep valuables by him, and there will be no crime.

64670. As regards compulsory education, you say you may have to face some difficulties at the start; what difficulties do you envisage?—When you want to introduce anything new you will have to face some difficulties; but in course of time, when people realise that it is to their advantage, they will welcome it.

64671. But you say that in your Province you have the monastic schools and that people are familiar with the idea of education?—Yes.

64672. Then what are the difficulties?—When they find that Government are forcing a new system on them, certainly they will raise difficulties at the start.

64673. Are you familiar with the district councils?—You mean the district boards?

64674. Yes?—I know district educational boards.

64675. You say that the monastic system of education is very popular in your Province; but that system of education has not reduced crime, has it?—It has had some effect. On the other hand, you have to consider this: that necessity knows no law; when people are driven to starvation by poverty they take the law into their own hands. Moreover, there are many temptations to modern luxuries.

64676. You say that compulsory education will reduce crime; that is not quite true then?—To some extent yes, but not totally.

64677. You talk of religious obstacles to cattle-breeding; what are the difficulties?—The Buddhists are not supposed to kill anything; when they come to know that the breeding of cattle is for the purpose of sending bad bullocks and surplus cows to the slaughter-houses, certainly they will object.

64678. Have the Buddhists any objection to using milk, butter, etc., as food?—No, because they can be got without killing.

64679. *Sir James MacKenna*: From where did you get the idea that the cows bred will be sent to the slaughter-house; is that from the Cow Convention?—There is no breeding farm now; when there is one, the surplus cows might be sent to the slaughter-house.

64680. I wanted to know where you got that idea from?—I made some enquiries.

64681. *Mr. Kamat:* You have read the Land Mortgage Bank Bill which the Burma Government want to pass?—Yes; in fact I was one of the members of the committee that went into it.

64682. Will you favour the Commission with your views on one or two points on that Bill?—If you will refer to the report, you will find my objections to the proposed scheme there; I have written a minute of dissent.

64683. That report has not been circulated to members of the Commission. In the proposed Bill the existing co-operative banks and primary societies are to be kept separate from the operation of the new Bill; what is your view on that point?—I object to that principle.

64684. On what grounds?—I will read out from my minute of dissent. "With regard to this system of land credit, it cannot be denied that the co-operative banks have, since their formation, been carrying on this business before anybody had any idea of forming a land mortgage bank. In fact the co-operative banks in Burma have been inundated with such long-term loans. Theoretically, these are re-payable in four years, but experience has taught that no such loans can be repaid out of the returns of the soil within so short a period. Now Government is contemplating the formation of a land bank which will be quite independent of the present co-operative banks. The result will be that the proposed land bank will take over the long-term loans by degrees from the existing co-operative banks, i.e., members who have any real estate will transfer their tangible security to the land bank after settling debts contracted with co-operative banks on the security of their lands. This means that co-operative banks will, in course of time, have no tangible security for loans of shorter terms. On the other hand, our proposal is that Government should, instead of running a separate and independent institution for long-term loans, give State aid to the present co-operative institutions to replace the loans that have been issued for land redemption or for the purchase of land. We should like to place our counter-proposal before Government and ask it to reconsider its decision, because Government's proposal, if adopted, will certainly have an adverse effect on the existing co-operative banks. If, however, our proposal is accepted there will be many advantages, some of which may be summarised as follows:—

(*a*) Government advances, if made through the existing co-operative banks, will be much safer than if made direct to individuals or to newly organised associations, because the co-operative banks, which have now firmly established themselves with their capital and reserves, will, in addition to actual borrowers' lands, form good security for the money.

(*b*) Government will have the advantage of using a trained staff for the work.

(*c*) The work can be carried out at a much lower cost than if run by the Government itself, and consequently a given amount of money would furnish more loans for hard-pressed cultivators.

(*d*) The liabilities of members of co-operative societies and those of members of the land mortgage societies will certainly clash against each other, as both of them are unlimited.

(*e*) Cultivators who have already onerous duties to perform for a co-operative credit society would not like to do more for another society of land credit because this means more interference with their agricultural work."

64685. I follow what you have to say on that point. Now, there is another point emerging out of that, and that is with reference to the running of land mortgage banks through your agency. The funds which Government will place at the disposal of your bank are expected to be very large; do you think you can run a bank with such large funds with efficiency and safety with the present type of staff, which you call trained staff, at your disposal?—Government are not going to give us all the money immediately; they are going to give it gradually. If Government are going to start on a big scale, then we must have a larger staff.

64686. The Bill contemplates the handling of large funds by the bank?—The idea was that Government should start on a small scale, at the most with

three crores, which is not very large considering the indebtedness of the nation.

64687. You would not consider three crores as very large?—Three crores is the limit; they might start with ten lakhs, which will not be very large.

64688. The investigation of title deeds relating to the lands calls for a certain amount of expert knowledge; do you think you will be able to manage that without the help of the Government staff?—Everybody, whether Government or a bank, must refer to records in Government offices. In Burma none of the title deeds are registered. A man may possess land now, but he can go to the Registering Office to-morrow and transfer the ownership without the knowledge of anybody else. I think, in comparison with the untrained Government staff, the co-operative staff which includes officials and non-officials has better knowledge in these matters.

64689. Would you not invoke, to a certain extent, the assistance of Government officers for the investigation of titles?—Yes.

64690. Except for that, you would be able to manage the organisation without Government assistance?—Yes.

64691. In the Bank Bill it is contemplated to have a board of control, and at the present stage at any rate the board will consist of certain officers of Government and, at most, a few non-officials but nominated by Government; that is to say, there will be no element of elected representatives on that board of control, either on behalf of the public or on behalf of the societies. Do you approve of that principle?—I object *in toto* to the present constitution of the board. In any way there should be an element of elected representatives on the board of control.

64692. Assuming that a board is to be created for the control of this bank, how would you like the board to be constituted?—The best thing is to have one board, with branches. As it is proposed to enact that, if one bank defaults, the other banks will pay, there should be one board with banks at district headquarters as branches. Unity is better than competition.

64693. Although you object to the proposed constitution, would you not recognise that, since this bank is to deal with large funds, a certain amount of responsibility rests on the board of control, and therefore officials like the Registrar of Co-operative Societies, the Director of Agriculture and the Financial Commissioner (men who have a wide experience in administration) should be on the board?—They should be; I think I do not object to the constitution of the board; I object to the whole system.

64694. Supposing one or two non-officials are put on the board to give voice to non-official ideas, would you be satisfied?—Officials should not dominate the board; non-officials must have an equal voice. If there are five officials, there should be five non-officials.

64695. Have you experience of non-officials managing large banks in this Province?—Yes; The Burma Provincial Co-operative Bank which is the largest co-operative bank in the whole of India with a working capital of Rs. 1,30,00,000, is managed by purely non-official Directors, none of whom are officials; they are business men. Directors of District Central Banks are also non-officials and also I think we have a trained staff in our managers of the branches of our bank and the District Central Banks.

64696. For instance, there may be a number of managers of district banks, men who have handled crores of rupees?—It depends on whether the man knows the principles of banking. It does not matter whether he handles one rupee or a hundred, or a lakh; it is just the same.

64697. *The Chairman:* Is it the same when he loses?—It is not the same when he loses. What I mean is that a trained man has less chance of losing.

64698. *Mr. Kamat:* On the question of your enquiries into the earnings of families, when you say that twenty to thirty rupees is about the annual earnings of a family, do you mean that it is the sum total of the earnings of the four or five members of the family?—Yes.

64699. You think that thirty rupees represents the average earnings, taking the average of a family of five?—That sum is the profit, after deducting all expenses.

64700. It is the net profit?—Yes.

64701. Divided by five, it gives six rupees per head per annum?—Yes.

64702. Eight annas a month is the total saving of a man in Burma?—It comes to that, because he has to pay a high rate of interest; otherwise, he would save a bigger amount. As you know in Germany the rate of interest was three-and-a-half per cent; they are skilled labourers.

64703. On the question of indebtedness, there is a statement in the official memorandum submitted to the Commission to this effect: "If a peasant has to borrow to buy, say, new plough-cattle, when he could have saved the money by retrenching on superfluities, then in effect he has borrowed to buy those superfluities, and not for productive purposes." Supposing a man had to borrow to buy a bullock for productive purposes if he has not saved money by retrenching on superfluities, that is to say, suppose instead of buying a cotton *lungi* he buys a silk one, then, in effect he has to borrow for buying the bullock because of the silk *lungi*, because he did not save by purchasing a cotton *lungi*. If he had exercised economy, probably he could have saved the money to buy a bullock?—Do you mean to say that the cultivators are not practising economy.

64704. This is what is alleged, and I am asking your own view, because you know life in Burma better than I do ?—I think the cultivators are practising thrift. They are not bent on luxuries. The people who are bent on luxuries are those who are in the towns, the well-to-do people, the moneylenders living in the villages who exploit the rural classes of people.

64705. Your statement is that the moneylenders are not thrifty, but the cultivators are thrifty?—Yes; the moneylenders have sufficient income.

64706. And the suggestion, therefore, that in Burma thrift does not appeal to the ordinary cultivator and that he spends on superfluities is not correct?—It is not correct.

64707. The copies of your economic enquiry results were sent up to the Registrar?—Yes. I reported the result.

64708. Were they published by him?—No; they were for his information only.

64709. How many families did you investigate?—I made an enquiry with regard to about ten families this year.

64710. These were rural families?—They were in the rural area and not in the towns.

64711. And you found in these cases that eight annas was the saving per man per month?—Yes. It will be so, so long as they have to give a high rate of interest.

64712. *U Ba Cho:* You say that the co-operative movement in Burma is at a standstill?—No; it is going backwards.

64713. Have you made enquiries from the people who are interested in the movement as to the reason why it should be so?—I have made enquiries.

64714. Several people gave several reasons?—Yes, there are many reasons.

64715. Do you not think that we should form an enquiry committee to go into the point and see what are the real causes for the set-back to the co-operative movement in Burma?—In 1923 we suggested it, and before that too we sent many letters to the Registrar asking for an enquiry. In 1924, at the conference, we suggested the same thing for inclusion as one of the items on the agenda. Very recently too we sent up a proposal to hold an enquiry.

64716. Do you mean to say that persistent requests were made by the co-operative people for an enquiry of this nature?—Yes.

64717. Speaking about the deposits in the Central Banks by local bodies, you know that as a result of the agitation in the Legislative Council an Act has been passed, whereby local bodies can deposit their money in the co-operative banks?—Yes, it is Act V of 1923.

64718. Up to now, no effect has been given to this?—No. In fact, there is an objection on the part of the Government. They object to the deposit of the funds of local bodies in co-operative banks.

64719. When the proposal went up to Government for sanction, they objected?—Yes.

64720. Did they assign any reason for refusing to give sanction to the proposal?—You know the reason given in the Council.

64721. I want to get it from you?—I know the reasons, but I do not wish to disclose them.

64722. Did the Government assign any reason for refusing to give their sanction to it?—There was no reason assigned, as far as I know.

64723. You are talking about the many calls upon the societies, mostly on primary societies, under the present system. Are you in favour of audit being done by the societies, or by the Government?—I think it is better, especially in the present circumstances of the societies, that audit should be done by Government, as it is done in some Provinces in India.

64724. Can you give any reason why audit should be done by Government now? What will be the benefits?—The public will have more confidence in the societies. At the same time, societies in straitened circumstances should be relieved of the burden of contributing any audit fees. If Government conduct the audit, of course the societies will be relieved of the burden.

64725. In answer to the Chairman, you said that the Government should give loans to the banks at a fairly low rate of interest. Do you mean to say that Government should go on giving loans for ever?—Not for ever; I never meant that; but I think that at the present juncture, State aid should be granted. In fact, I would rather have a State bank, as they have in Germany.

64726. You remember, the Maclagan Committee of 1914 spent fully a month in Burma, going to every corner where there were co-operative societies, and they came into direct touch with the people in the societies?—Yes.

64727. At the time of the Maclagan Committee, the co-operative movement in Burma compared very favourably with that of any other Province in India?—Yes.

64728. And now we are lagging behind?—Yes. I can give you the reasons. Time and circumstances have changed a great deal. Burma is not like India. The people are far advanced. They have had a glimpse of advanced civilisation which has gripped them and the national standard of living has become high, whereas their income is very small.

64729. You said that you had been to India to study the co-operative movement in other Provinces. How do you think the average Burman or the average cultivator in Burma compares with his brother in India, in point of literacy, intelligence and knowledge of co-operative principles?—Our people are much better; they are far advanced, and they are far better than Indians.

64730. In Burma, we have no caste system?—There is no caste system.

64731. There is no *purdah* system?—No.

64732. The people have practically one religion?—Yes.

64733. And they are mostly a village population?—Yes.

64734. And, with all this, the co-operative movement has not gone ahead here; it has not been very successful?—The essence of the business is capital. Without capital you cannot do anything. In Burma, we have no national banks of our own except co-operative banks, and so the wealth of the people has not come to the banks. We are also much behind in banking education. So, our cultivators have not got sufficient capital to finance their operations.

64735. Do you not think that the check to the co-operative movement in the last year or two is due more to the very bad report about them made by the Registrar of Co-operative Societies in his annual report? The people come to know that the co-operative societies are not doing very well, and so they have become shy of putting their money into the societies?—I think we could get any amount of deposits, if we could give a reasonable rate of interest, but I do not think we can get reasonably cheap credit for members of co-operative societies; this is the reason why I suggest State aid. It is not on account of the bad report; it is because the societies are really bad.

64736. You admit that the Registrar has reported that the societies are in a bad way?—It is not their fault that they are in a bad way. As I said, co-operation is not an established subject. It ought to be revised according to times and circumstances. If we do not do so, there will be failure.

64737. What I mean to say is, co-operative societies are not so bad as the Registrar thinks?—They are bad.

64738. Are they as bad as he thinks, or worse?—I think they are as bad as they are painted. In fact, to tell you the truth, I think the societies are in a very bad way in the dry tracts.

64739. When you say that there is no improvement in the societies, are you speaking from the pecuniary point of view, or do you mean that there is a falling off in the knowledge of co-operative principles?—It has nothing to do with co-operative principles. We are quite all right in regard to education.

64740. From the reports which I see from time to time I gather that the co-operative movement in Burma is not going ahead as it ought to. Is that due to the fact that the capital is going down or is there a lack of knowledge of co-operative principles?—So far as knowledge and education are concerned the people are all right. What we want is reasonably cheap credit.

64741. By establishing land mortgage banks, the difficulty of getting money will be relieved to a certain extent?—Certainly that will give relief.

64742. From the report of the working of the society for the year ending June 1926, I find that you have over six lakhs subscribed capital and you have very nearly thirty-four lakhs invested in Government paper?—Yes. We have invested over thirty-four lakhs in Government paper securities, and our subscribed capital is over six lakhs.

64743. These investments do not pay you more than five per cent?—The average is four-and-a-half.

64744. Do you not think that you have invested too much in Government paper?—In the present conditions of the society I think it is small.

64745. Practically you are investing all your money in it?—This is a co-operative bank only in name. It cannot be really co-operative so long as we have to rely on the public. We must safeguard the interests of our depositors by having a high standard of resource.

64746. What is your working capital?—It is one crore, thirty lakhs.

64747. Do you contemplate a big and unexpected call upon your bank?—No. But we have to watch the situation carefully.

64748. There is no fear of a sudden rush upon the bank?—Our bank can go on without receiving any money from the societies for one year. Otherwise the bank would have been landed in a very great difficulty.

64749. So, really, you do not want a large investment in Government paper, which is bringing in only a small rate of interest?—We do want it because the whole system in Burma, including all district banks and urban societies, has to rely upon the Provincial Bank for their liquid resources. That being the case, we must keep this large amount of Government money so as to provide them with the amount they require. The position in Burma is that we have to provide for every society and association.

64750. Since the introduction of the co-operative movement, we have been having conferences, provincial, co-operative and agricultural, in Burma every two years?—Yes.

64751. Up to the year 1925?—I think 1924.

64752. I think it is 1925. This is not going to be the case in future?—I was given to understand unofficially that the conferences which met once in two years did not serve the purpose they were intended to serve. I think the idea is to hold them on a bigger scale once in four years.

64753. These conferences are doing a great deal of work in Burma?—Not so much as we expected.

64754. Do you not think that a certain amount of good has been done?—Yes. They have done some good.

64755. Do you not think it would be a good idea to have conferences every two years?—I think the suggestion to hold it on a bigger scale once in four years is better.

64756. You would favour that?—Yes

64757. *The Chairman:* Do you, in Burma, accept as the ideal of the co-operative movement the motto "Each for all and all for each."?—That is ideal co-operation.

64758. It involves a certain amount of discipline to live up to that?—We are trying to reach it but we have not reached it yet.

64759. You have detailed many of the excellent qualities which your countrymen show. Do you think the capacity for discipline is one of those qualities?—Yes.

64760. *Mr. Calvert:* In the profit and loss statement which is included in your annual report, you show all the profit accrued as actually paid?—That is only up to 1925, not for the last two years.

64761. Then, that is not correct?—It is a trifling matter. The interest will be due next year and it will not make much difference. Supposing we took interest for three months as interest received, this amount will be due in the coming year.

64762. The statement that you recovered the whole of what is due is not correct? You took a paper credit? You did not get it in cash?—We should say that in certain items we got it in cash. For instance, interest on Government paper was due for a certain period when we drew up our balance sheet, and although this sum was not actually received at that time, we can take it as having been received because the amount was credited by the Imperial Bank to our account on due date. It entirely depends on the nature of accrued interest.

64763. You did not recover the interest due to you from the societies but debited it as principal against them and showed it as capital?—We create a reserve for this; it amounts to that; we usually show the receipt on one side and we credit a reserve against that ; that equalises.

64764. It was not paid in cash. It was a book debit and credit?—We did not take it as a profit because we create a reserve against that sum.

64765. You show that this sum was actually received when it was not actually received?—We create a reserve against that sum; we are not taking that as a profit.

64766. You have taken book credit for three lakhs of interest due to you?—We provide a reserve for that.

64767. When you get a repayment from a society do you first credit it to interest?—Yes.

64768. Where your recovery is most satisfactory, you credit yourself the full rate of interest?—Yes.

64769. I cannot make out from your figures whether your recoveries were thirty-four or sixty-five lakhs. Are these actually recovered in cash or do you also have book adjustments?—We took only the cash payment, not the book adjustment.

64770. You only take the actual cash receipts?—Yes, we do not take the book adjustments. I have just one point more which I should like to place before the Commission. I wish to propose that provincial central banks and co-operative banks should be allowed to open a personal ledger account in the Treasury.

64771. *Mr. Calvert:* But you could at present deposit your funds in the Treasury although not with the Treasury?—We are to keep our safe in the Treasury. What we want to do is to be able to put it into the Treasury as a personal ledger account, just the same as the municipal district boards and the Forest Department are doing.

64772. What is the difference between putting your money in a safe in the Treasury and putting your money in the Treasury safe itself?—For instance we have got our branches at certain places. In the evening they should be allowed to credit all their money into the Treasury where there is no branch of the Imperial Bank.

64773. What exactly is the difference to you?—We could check the branch account more thoroughly in that case.

64774. At the present moment your branch manager puts the balance into your safe and deposits the safe in the Treasury and he then sends you a post-card saying that he has done so?—Yes.

64775. What you want is that he should put the money into the Treasury's balance and that the Treasury should write a post-card saying that the money had been deposited?—Yes. Entries will be made in the pass book.

64776. Does that mean that you do not trust your branch manager?—No, I do not mean that. The work can be checked better. I do not mean to suggest that I do not trust my branch manager. The work should be done on business principles as much as possible. All I mean to suggest is that the work can be better carried out under this system.

(The witness withdrew.)

U AUNG DUN, A.T.M., Rice Miller, Daingtaw, Mandalay.

Replies to the Questionnaire

QUESTION 2.—AGRICULTURAL EDUCATION.—(*i*) As regards the teachers they are fairly sufficient. As regards the students, the number is not yet sufficient.

(*ii*) The majority of people in every district of Burma earn their livelihood by cultivation and therefore all the districts desire agricultural education. There are yet very few persons among the cultivators who are well informed about any crops that would be profitable to them, according to the nature of the water and soil in their locality, other than the crops grown by their forefathers.

(*iii*) The reasons why teachers are not available at present from the agricultural classes are as follows:—Very few children of the cultivators acquire an English education and very few of them know English. None of the lessons taught in agricultural schools are taught in Burmese. Persons having educational qualification lower than the tenth standard in English cannot properly follow the course of lessons. It is quite unusual for persons who actually earn their livelihood by cultivation in Burma to be acquainted with the various lessons now taught. For these reasons the number of persons desirous of joining the school does not increase.

(*iv*) I understand that as large a number of students as is required cannot be procured at present. This happens so because a person who wishes to serve the Government and who has already passed through the tenth standard has to study hard for about four or five years in the agricultural school and still it is difficult for him to pass an examination and gain the knowledge. Besides, a man serving in the Agricultural Department thinks that he is a little inferior to others who are serving in other departments. The actual cultivators who are the most immediately concerned do not care to study English even for the first standard, let alone the tenth standard, in order to study agriculture. It is therefore difficult for them to study agriculture, and naturally the school cannot flourish.

I am of opinion that in a school where agriculture is taught, there should be three classes. Those who wish to serve the Government and who pass the examinations of the first and second classes ought to be given appointments according to their educational qualifications. Those who have studied for the said classes and failed ought to be considered as not inferior to persons of the third class. As regards persons who are to be in the third class, they should be drawn from the Burmese cultivators who wish to join the school. There ought to be just enough provision for them in the school and they ought to be given scholarships and taught. After they have thus learnt and acquired the knowledge, the honest and skilful persons should be selected and should be divided into parties of five persons each. Each party should be made to cultivate not less than

250 acres of waste land. Then, after forming them into societies, if the Government would give them freehold grants and help them with expenses, cattle, seeds and provision and also loans at a small interest and on long-term credit and take measures to control and supervise them, it is possible that the number of students attending school would increase.

(*v*) As an incentive to induce and encourage lads to take to agricultural education, it should be made to form part of the curriculum in all the vernacular schools which are now existing in villages, as well as in all the anglo-vernacular schools according to the standard, as an important subject in place of other subjects which are considered superfluous. Steps having thus been taken to give effect to the suggestions mentioned above in all the schools which are in the towns and villages, special attention should be paid to, and notice taken of, the practical work done in school farms, and suitable rewards should be given according to the merits of the case. The elders of the towns and villages should also collect children at night time once in a month and give lectures to them on this subject, as though they were relating to them some story, in order to impress it on the minds of the children. Another method to arouse the interest of the children is to make films after the manager of the dramatic films now being produced, depicting the scenes of people in agricultural life who have attained success and progress as a result of their venture as pioneers in growing and cultivating crops that are profitable, and exhibit the same free of charge before the children in each township. By doing so it will become popular before long. I am of opinion that this suggestion ought to be made to producers of films.

(*vi*) Pupils from such classes are not available.

(*vii*) Modifications are called for. The medium of education in agriculture now being English, the same should be translated into Burmese in order to bring it within the understanding of cultivators in Burma.

(*viii*) (*a*) With reference to nature study it is fairly satisfactory.

(*b*) The school plots need extension.

(*c*) School farms also need encouragement for the attainment of a full measure of success. At present they are merely termed school farms, but no special improvement has been made in order to attract the minds of the students. It will be much better if teachers would take the students occasionally to places where cultivators are actually working and show the same to them and awaken their interest.

(*ix*) The majority of them become salary earners.

(*xi*) Suitable improvements have gradually been made, according to the condition of the tracts.

(*xii*) In order to popularise it in the tracts, small experimental farms should be opened in every district or in each township and the headmasters of schools, Township Officers and the officers of the Department of Agriculture should hold exhibitions in co-ordination with one another once a year. By doing so it is possible that it can be popularised in rural tracts. Another important factor is that it would be much better if the Township Officers were to acquire a knowledge of agriculture.

(*xiii*) The children of cultivators should now be selected, they should be taught agriculture in Burmese in the schools and those who have acquired the knowledge and who are earning their livelihood honestly should be formed into societies. If they have no land of their own they should be granted waste lands. If they have lands which their ancestors have placed under mortgage these should be redeemed for them, by granting them advances at a low rate of interest. If they are required to serve the Government new posts should be created for them in places suitable for their employment. If facilities be given in this way by the Government progress can be made before long. It would also be much better if the Government help them with their expenses in the shape of stipends for the three years during which they are studying.

(*a*) The number of officers in the Agricultural Department is insufficient. It would be advisable to appoint a full complement of staff of Directors of Agriculture, etc., in each jurisdiction of a Divisional Commissioner, further augment the staff of second-class subordinate officers in every district and also appoint third-class officers and subordinate itinerant officers in every township for touring and giving instruction by practical demonstration.

U Aung Dun]

(*b*) Everything will be simplified if the granting of advances to agriculturists be delegated to the charge of Township Officers and control exercised over them by the Department of Agriculture.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(*a*) In the matter of prosperity of the cultivators the following derogatory factors have arisen and progress and advancement can only be made if Government assist in the matter.

There are few persons who own lands with actual possession thereof. To cover the initial outlay for procuring seed-grain, cattle and paddy for subsistence and the expenses of cultivating, loans have to be taken from the landlords at heavy rates of interest as advances for the supply of paddy at the harvest. Such paddy advances are usually taken at the rates of from Rs. 100 to Rs. 120 per hundred baskets of paddy to be delivered. Whatever may be the market price, the paddy when harvested has to be delivered to the creditor in satisfaction of the debt. When the paddy is harvested, it is found impossible to store it and it has to be disposed of at any price named by the brokers and persons whose business it is to store paddy. In cases where money is taken in the shape of loans an interest of not less than Rs. 5 is charged on Rs. 100 and it has to be repaid to the creditors immediately after the sale of the paddy. The use of fertilisers has not as yet been quite freely and adequately resorted to by most of the cultivators and therefore the yield is poor. The impossibility of planting paddy in time in the areas where paddy lands are irrigated by canals and the insufficiency in the supply of water required by the plants also account for the shortage in the yield. Therefore progress can be made only when measures can be taken to safeguard against these important factors.

These measures are:—

(1) Opening of land mortgage banks.

(2) Granting of agricultural advances, at a cheap rate of interest, sufficient to cover the cost of nursery plants, etc., after making enquiry as to the needs and requirements.

(3) The use of fertilisers on the lands already brought under cultivation should be strictly enjoined.

(4) The officers of the Irrigation Department should see, according to the nature of their charge, that water is supplied without fail when it is required.

(*b*) If the process found to be advantageous after a test made by the department concerned be shown to good effect by means of practical demonstrations carried out, say on an acre or two of land taken on a year's lease from amongst the area of land owned by the cultivators in the jurisdiction of any particular village headman, the cultivators living in the neighbourhood will be able to visualise and appreciate it.

It will be much better if about ten such plots of land are allotted for the said purpose in each township.

(*c*) To make the cultivators amenable to the instructions and directions given by the Agricultural Department it will be far more satisfactory if the above-mentioned advances are given out by the Agricultural Department, when all the requirements can be fully met.

As an instance of success obtained and benefits thereby gained to the cultivators as a direct result of personal demonstration undertaken and shown by me while I was in service I cite the following:—

They are—

(1) *Theikpan Ngasein Taungdeikpan* paddy known as 2104 and *creman* sugarcane in Kyaukse district.

(2) *Cambodia* cotton, *pindaung* groundnut and *Karachi* gram in Mônywa district.

(3) Wheat, onions and sugarcane in Shwebo district.

(4) *Ngasein* paddy, *Taungdeikpan* paddy and grams in Mandalay district.

(5) Grams and *Pwinyu* cotton in Sagaing district

As I have not been to these places lately I do not know whether these are in a progressive or backward state. As regards the species of *Ngasein* paddy, I have learnt that the cultivators have grown less quantity of *Theikpan* paddy in this year in Kyauksè district as water could not be obtained at a time favourable to the crops, and owing to insufficiency in the supply of water.

(i) With regard to the time for sowing, nursery plants are grown in the month of *Kason* and *Nayone*.

(ii) Transplanting is done in *Wazo* and up to the full moon of *Wagaung*.

(iii) After the transplantation operations are over, a continuous flow of water is supplied to the paddy lands, any superfluous water being drained off. Only if and when the above-mentioned requirements and conditions are fulfilled, will the outturn of paddy be improved both in quality and quantity and a good price obtained for the same. Otherwise it would result in poorness of yield and the preponderance of inferior grains usually marked with black spots or flaws and, as is well known, the price fetched would be considerably lower.

QUESTION 4.—ADMINISTRATION.—(*a*) The weather and the conditions in Burma are different from those in India. Therefore only the Government officers who have been in service in Burma for a long term of years can know about the weather and conditions of Burma. I therefore prefer the management of the Government of Burma.

(*b*) Many experts are required in every place. But it will be proper that Burmans who study and gain knowledge in Burma should be selected and appointments given to them. As it is in Burma all the cultivators are Burmans. The work will be facilitated in every respect if persons of the same race give advice to one another, as such advice can easily be understood and adopted.

(*c*) (*i*) It would be far better if the Government would add a department for collection, sale and purchase of paddy to the Agricultural Department in order to afford relief to cultivators.

(*ii*) The railway and steamer services are not unsatisfactory.

(*iii*) Many roads accessible to the cultivators from and to the places of their work are still wanting.

(*iv*), (*v*) & (*vi*) These services are not unsatisfactory.

QUESTION 5.—FINANCE.—(*a*) If the Government would grant loans sufficient to cover the requirements of the cultivators for their actual expenses, at a cheap or moderate rate of interest, it would confer a boon on them. There is one other matter: in the case of a man who has done his work honestly and well but has failed as a result of some calamity, the recovery should be made on a long-term basis, so as to enable him to redeem his land or else to acquire other land for cultivation; in this way only a great benefit will be conferred upon the cultivators.

(*b*) As the loans granted and issued under the provisions of the Agriculturists Loans Act are mainly for the expenses of cultivation and cost of seed-grains, and as the Agricultural Department alone is in a position to be conversant with the actual details of expenses, the true state of affairs with regard to such items of expenditure could be arrived at only if the work of granting such loans were transferred to the management of Agricultural Department banks.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—(*a*) (*i*) Want of money on the part of cultivators for buying cattle and redeeming lands.

Want of money for seed, for plucking and transplanting, for cultivation.

For the above-mentioned items of expenses as well as for the purpose of buying cattle and redeeming lands, loans have to be taken in the months of *Tagu* and *Kason*.

(*ii*) & (*iii*) To meet these expenses money has to be borrowed from the creditors in the months of *Nayone* and *Wazo*, according to the custom prevailing in their districts, at the rates of Rs. 80 per hundred baskets of paddy, or at the rates of from Rs. 100 to Rs. 120 per hundred baskets to be delivered promptly at the harvest. Some cultivators have to take loans on interest at the rate of Rs. 3 to Rs. 5 per cent per mensem,

Generally loans are taken on the *Sabapay* system, *i.e.*, to deliver paddy in satisfaction of the debt. Although they have to repay their creditors on such hard terms as these, cultivators have to cringe for the same and they can only get the loans when there are persons who are willing to go surety for them, howsoever they may be trusted. In the case of some of the cultivators who could not pay up in full satisfaction owing to irregularity of rain or some such cause, the value of a hundred baskets of paddy, calculated at the current price of Rs. 160 or Rs. 180, would be noted up against them as the principal amount due. This system is called "*Ngwe-pyan-toe.*"

(*b*) Legislation to afford protection against such illegal lending and borrowing can properly be undertaken only if, and when, the Government can grant sufficient advances. If such legislation be introduced before a sufficient amount of loans can be made, the cultivators will have to encounter still more difficulties, because the creditors will not lend them the money.

QUESTION 7.— FRAGMENTATION OF HOLDINGS.—(*a*) It would be very difficult to consolidate separate holdings. As the conditions of holding these lands are not the same, it would be very difficult to effect an exchange.

If it is at all necessary for the Government to interfere in the matter, it would be possible only if new allotments can be made after these holdings have been resumed. Therefore it is extremely difficult to do justice in this matter.

(*b*) I do not think it necessary to take any special measures in this respect. In fact, cultivators in Burma have only from five to ten acres of land each, requiring the use of one pair of bullocks. While the middle-class cultivators have no more land than can be worked by two to three pairs of bullocks, there is much land in the hands of persons who do not work the same personally but let it out to tenants and live on the rent. I do not think that any special measure is necessary.

(*c*) As regards minors and women who cannot go to the courts I am of opinion that legislation is necessary for directing the courts to recognise the decisions made by respectable persons of their respective localities and to make enquiry into and to confirm the same. If one of the parties, not being satisfied with the decision, appeals to the court subsequently, statements of elders who intervened in the matter should be confirmed if considered fit to be so confirmed. As regards rejecting the same, they are to be so rejected only for some very special reasons.

QUESTION 8.—IRRIGATION.—(*a*) (*i*) Canals from Zawgyi creek in Kyaukse district are now supplying water. But as there is much land and as the rainfall is scanty, lands which are irrigated by canals do not get a sufficient supply of water. Therefore cultivation cannot be done early enough in the season; as there is no change of water from hot to cold in the paddy lands, which have already been cultivated, the yield decreases as the paddy plants get heated. Therefore the cultivators are grumbling over this a great deal. As there is less water in the canals, small canals called "water-courses" are dug in order to economise the use of water. I have noticed that this method does not meet with the cultivators' approval.

There are two methods of cultivating paddy: wet cultivation and dry cultivation. As regards wet cultivation, the plants cannot thrive if there is a lack of water for the land from the day of ploughing up to the time the crops are about to be reaped. For the paddy lands which have been cultivated dry, also it would be much better if the long-standing water were replaced by fresh water in the months of *Tawthalin* and *Thadingyut*. If such change cannot be effected the plants get heated by the hot water and therefore the yield decreases. If it is desired to economise the use of water, it would be much better to give a supply of water to the lands after they have been cultivated under the dry cultivation system, similar to the method adopted in growing wheat in Taze Township, Shwebo district, as suggested by me formerly.

QUESTION 10.—FERTILISERS.—(*a*) As regards natural manures, they can be applied only if water is available early in the season. As regards artificial fertilisers, there is no difficulty about them and they are good.

(*b*) I have found that it is advantageous to a great extent to use a mixture of the two kinds of fertilisers, *viz.*, bonemeal and cowdung.

(*c*) In order to popularise fertilisers which are advantageous, an acre or two should be marked off and taken up from any suitable person out of his already ploughed land in the jurisdiction of any village headman. Then one part should be treated with manure, leaving the other part without any such treatment. Thus if two plots of land, measuring one acre each, be selected and worked simultaneously by way of a demonstration and watched over until the crops have been reaped and measured, the results can be understood and appreciated by the cultivators.

Of all the fertilisers already tested I find that bonemeal, superphosphate, potash and sulphates are good. The profit derived from the yield of the land treated with these fertilisers does not cover even the cost of these fertilisers and is not commensurate with the expense incurred. As it is now difficult to get sufficient cowdung, in places where there are rice mills the cultivators manure their lands with ashes of paddy husks and this is a good substitute.

(*d*) It is now definitely known that the use of cowdung alone would be profitable in Kyauksè and Mandalay districts.

(*e*) Owing to the high cost of these chemicals which is not commensurate with the increased yield of paddy, it is not profitable to use these fertilisers.

(*f*) The majority of people do not use cowdung as fuel. The Brahmin Indians and those who make carts use cowdung as fuel. It is possible that this practice can be stopped by the Public Health Department as it is dangerous to health in towns and villages.

QUESTION 11.—CROPS.—(*a*) (*i*) As improvement has now been made by the Agricultural Department in the matter of good and pure seed, rice mills buy it at an enhanced price. As the seed is pure the crop is uniform and ripens simultaneously. It is evident, for these reasons, that there must be an increase in the yield of paddy.

(*ii*) Of the seeds imported from foreign countries, Karachi gram is appreciated by all the cultivators who cultivate it. I have noticed that it has become more popular as its use has become more and more extensive year by year. As regards a species of millet known as saccoline used as fodder for cattle, it is known that both the ear and stalk are liked by the cultivators. This seed has become popular gradually and has now spread amongst the cultivators.

(*iv*) As regards the question of preventing damage by animals, it is possible to prevent it if the Township Officers, having in view the damage caused to the cultivators, would take the trouble of taking measures for protection.

(*c*) Besides paddy, crops such as sugarcane, cocoanut, plantain, Indian corn, tobacco, onions, groundnuts, gram and betel are profitable according to the condition of the soil.

QUESTION 12.—CULTIVATION.—(*i*) Cultivators are now not in a position to use improved implements.

(*ii*) It is profitable to practice rotation of crops, but at present cultivators have not sufficient knowledge for adopting these methods. Knowing that mixture and rotation of crops are profitable, I have made demonstrations in agricultural tracts. In places where rainfall is irregular it is worked on a small scale; in places where rainfall is regular, some of the cultivators adopt these methods.

QUESTION 14.—IMPLEMENTS.—(*a*) At present a better suggestion than the one given by the Agricultural Engineering Department cannot be given.

(*b*) The adoption of implements by cultivators will only be hastened if a good implement can be obtained at a cheap price and can be used easily.

(*c*) It will be accelerated if the cadre of subordinate officers is increased in the districts and encouragement given by practical demonstrations, in the same way as the Agricultural Engineering Department has now been doing.

QUESTION 17.—AGRICULTURAL INDUSTRIES.—(*a*) Formerly some of the cultivators did not have leisure even for a single day. I now find that cultivators rest for about 100 days out of the 365.

Oral Evidence.

64777. *The Chairman :* U Aung Dun, you are in business as a rice miller at Mandalay?—Yes.

64778. Would you give the Commission an idea of the extent of your own business?—I can mill some 1,000 baskets of paddy into 150 baskets of rice a day.

64779. Do you buy rice from cultivators through your own agents direct?—I buy through the brokers.

64780. Do you ever act as a broker yourself?—Sometimes I do act as a broker, and I buy direct also.

64781. Do you act as a broker for other millers or do you act as a broker for your own business?—I do not act as a broker for other mills.

64782. Do some villages measure in larger baskets than others?—In the same village there are several baskets of different capacities.

64783. Do you think that it would be a good thing if arrangements could be made for everybody to measure rice in the same size basket?—Under the present circumstances it is not possible to standardise the basket. By and by a standard size basket will be introduced.

64784. Why is it not possible at this stage to standardise the basket?—It all depends on the stipulations made by the sellers of paddy. Each seller of paddy insists that the paddy shall be sold in his own special basket.

64785. But surely those stipulations only hold good from crop to crop?—There are stipulations with regard to all the various crops, for example, sesamum, gram, etc.

64786. But surely the stipulations as to the size of basket to be taken as the measure only apply to one season ahead?—We buy and sell and we agree among ourselves as to which basket is to be used for measuring.

64787. I do not see, if these objections are valid, why you should expect that standardisation will be possible in the future?—The basket that is used in the villages apparently has to conform with the basket used in the rice mills. About ten years ago the difference was about ten baskets in every hundred baskets. At present the difference is only about three-and-a-half to four per cent. The basket is becoming standardised gradually.

64788. On what basis does the broker operate for you?—I have to pay two rupees brokerage on a hundred baskets of paddy.

64789. Do you sell any unmilled paddy?—I do not sell unmilled paddy, only rice.

64790. What is the unit upon which you sell?—I sell by the bag.

64791. Were you in the Agricultural Service at one time?—Yes, I have served in the Agricultural Department.

64792. In what capacity?—I worked as a farm superintendent and I have also worked in five districts.

64793. Do you attach great importance to the cultivators getting a premium for an improved quality of rice?—Yes, I do attach importance to that.

64794. In order to encourage the cultivator to grow better qualities?—Yes.

64795. Do you think that the difference in the size of baskets by which paddy is sold and the consequent risk of confusion very often leads to the cultivator getting less for his rice than he ought to get?—The cultivators do not get less than they ought to get, because the brokers pay for the paddy according to the size of the basket.

64796. Do the brokers buy from the individual cultivators in every case, or do they sometimes buy from a group of cultivators?—At the harvest time, brokers buy from individual cultivators, but later they buy from people who store paddy.

64797. And these latter very often mix the lots of various cultivators; is that so?—Some mix them, but some keep the lots separate; the majority mix them.

64798. Do you understand the principle of the open market?—No.

64799. Do you think that it would be possible to arrange that rice should be sold by the cultivators in a market where practices are controlled and where measurement and weighment are made by neutral tallymen?—Under the present circumstances, no.

64800. Brokers do business for a few buyers, but they buy from many cultivators; do you think that brokers are inclined to favour a buyer rather than a seller?—Generally they favour the sellers.

64801. Why?—They get their brokerage only from the sellers; that is why they are inclined to favour sellers.

64802. If you thought that one of your brokers was favouring a cultivator (the seller) to your detriment, would you do further business through that broker?—Generally I have to depend upon the brokers to get my paddy.

64803. Do you mean that if you had the choice you would do business not with the broker but with the cultivator?—If I do not do business with a broker, that broker will find other buyers.

64804. *Dr. Hyder:* You say that the cultivators used to work 300 days but that they now work only 100 days; the cultivator is now much better off than he used to be?—The cultivators are perforce idle for about 100 days out of 365 days in the year because there is no work for them.

(The witness withdrew.)

U SHWE, Schoolmaster, Representative of Co-operators of Upper Burma.

Replies to the Questionnaire.

QUESTION 1.—RESEARCH.—(*a*) (*i*) The majority of the agriculturists in Burma are accustomed to cultivate only the usual and customary kinds of crops, grow unseasonal crops, stick to one particular kind of crop only and use bad implements. They do not select pure good seed grain for sowing. The result is that much time is wasted and the outturn poor.

(*ii*) In rearing animals also they do not pay much attention to them and there are none who are acquainted with the methods of guarding them against diseases. So, under their care, cattle do not thrive.

(*b*) In order to impart agricultural knowledge to agriculturists, it is necessary: (i) to educate the children of the agriculturists in the science of agriculture, (ii) to propagate and spread the said knowledge through the agency of experts, and (iii) to enable the cultivators of every locality to avail themselves of the best methods of agriculture.

(*c*) In connection with research not at present being investigated to which attention might usefully be turned, I would suggest—

(i) To enlist those who are earning their livelihood lightly by means of work other than that of agriculture in the agricultural villages and make them work without interruption.

(ii) To take strict measures to make it compulsory for the children of the agriculturists, living in villages, to study agriculture and learn handicraft.

QUESTION 2.—AGRICULTURAL EDUCATION.—(*i*) The number of teachers and institutions is not sufficient.

(*ii*) The extension of teaching facilities in the districts is an urgent need.

(*iii*) Teachers in rural areas should be drawn from the agricultural classes.

(*iv*) The attendances at existing institutions are not as numerous as I would expect in the present circumstances. This is due to the fact that the parents of the children have no faith in the idea that it is more advantageous for their children to carry on the work, handed down from generations, after they have completed the various courses of education. It is only by the administrative authorities of the Local Government and not by mere common education that the demand for instruction can be stimulated.

(*v*) The main incentives to induce lads to study agriculture are to make the pupils do gardening work themselves and give aid and encouragement to those whose crops are the best.

(*vi*) Yes, pupils are mainly drawn from the agricultural classes.

(*vii*) Yes, modifications are necessary in the existing courses of study. These are the inclusion of—

(*a*) Garden plantation, and

(*b*) Handicrafts, such as wood, cane and bamboo work.

(*viii*) (*a*), (*b*), *and* (*c*) should, I think be studied.

(*ix*) The majority of students who have studied agriculture are employed only as paid servants, for example, as agricultural demonstrators and farm superintendents, after they have left college.

(*x*) Agriculture can be made attractive to the middle-class youths in this way: They should be given education so that they may take interest in agriculture and realise that agriculture is the means of one's own progress and success in life, and the Local Government should encourage the work of those who take up agriculture as their means of living.

(*xi*) There are no recent movements for improving the technical knowledge of students who have studied agriculture.

(*xii*) Adult education in rural tracts can be popularised in this way: the Local Government should recognise the services of those who are educated in preference to those who are not, and should give differential treatment in social dealings.

(*xiii*) For better educational facilities in rural areas, I would suggest the following schemes:—

(*a*) The Government should take a list of children between the ages of 4 and 15, find out in what work they are employed and how they are brought up and take action against those children who do not take up education.

(*b*) The children of really poor parents should be educated as boarders in school and their expenses paid.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(*a*) The measures which in my view have been successful in influencing and improving the practice of cultivators are only those laid down by the officials of the Agricultural Department.

(*b*) For increasing the effectiveness of field demonstrations, I would make the following suggestions:—

(1) To point out and demonstrate the methods of agriculture to the agriculturists.

(2) To encourage and recognise the services of those who adopt the methods of agriculture as pointed out and demonstrated.

(*c*) Cultivators may be induced to adopt expert advice as follows:—

(1) Agriculture is of great importance and should be looked up to by all.

(2) One reaps real advantages by duly adopting improved methods of cultivation. Due recognition should be accorded to those who adopt such methods. This arrangement and advice would increase the number of cultivators adopting expert advice.

(*d*) (1) The success of demonstration and propaganda work is so small in the district that it can only be just said to have been adopted, with the result that no real advantages have accrued yet.

(2) As regards the success of the said work, the rural population may be called paddy and *ya* cultivators; they adopt the old methods of cultivation handed down from their forefathers and have not got through even the preliminary course of education, which they are required to study. They do not recognise the existence of agricultural education and do not even understand the demonstration and propaganda work.

QUESTION 4.—ADMINISTRATION.—(*b*) I am of opinion that expert scientific knowledge could be supplied to a greater extent than is the case at present by increasing the scientific staff of the Government of India.

(1) The types of work which would benefit by pooling the services of experts are—

In every rural tract persons should be chosen from amongst agriculturists, and those who can take the lead should be encouraged and arrangements should be made, to form agricultural societies in each tract.

(2) The said work should be controlled in the same manner as in the cases of the Co-operative and Agricultural departments.

(*c*) I am not satisfied from the agricultural standpoint with the services afforded by the following departments. Directions in which these services might be improved or extended are—

(i) As regards the extension of the Agricultural and Veterinary services, arrangements should be made so that every agriculturist should get thoroughly acquainted with the lower standard lessons of the departments concerned.

(ii) Regarding railways and steamers, arrangements should be made to facilitate the consignment and carriage of crops and to reduce the rates of such consignments.

(iii) The arrangements made at present with regard to roads still require much improvement. Much more improvement is still required in the communication services between the districts and townships and village-tracts.

(iv) As regards the procedure adopted by the Meteorological Department at present, only the departments of Government know anything about them. As these matters concern the agriculturists very much, arrangements should be made for the agriculturists of every village-tract to know and understand them.

(v) Posts and Telegraphs are in existence at present only in large towns. Arrangements should be made for them to be in existence in every village-tract.

QUESTION 5.—FINANCE.—(*a*) I am of opinion that steps should be taken for the better financing of agricultural operations.

The arrangements for repayment in three or four instalments of the loans now advanced on mortgage of substantial security do not yet help much to improve the conditions of the agriculturists. As a higher rate of interest is charged for the amount borrowed for the cultivation and consumption expenses of the agriculturists yearly, if the Government would issue loans for repayment the same year at the rate of ten per cent per mensem, the agriculturists would very much profit by this arrangement.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—(*a*) (i) Most agriculturists, when arrangements are at first made for cultivation, have no paddy land of their own and have therefore to take land on rent. Further, they have no cattle nor do they have seed-grains for sowing, nor do they have paddy for consumption for the whole year round. So, they have to take loans and invest the same from the very beginning of their work. Such arrangements tend to decrease the outturn. The cultivation and consumption expenses are great, they are unable to pay in full the loans which they originally took and this is how they get indebted.

There has been no practice amongst the agriculturists of making careful estimates of income and expenditure beforehand; their liabilities become greater than their receipts, and so they are apt to get into debt; therefore they have to take loans.

(ii) Those agriculturists who have little or no security to offer can take loans only from the landowners and well-to-do people of their villages. Those agriculturists who have adequate security to offer have to take loans either from the *chetties* or from the Chinamen. In the case of loans taken in the village-tracts where co-operative credit societies have been formed, it can be said that such loans are taken from such societies and spent; but, as a matter of fact, the loans taken from such societies are not sufficient and therefore the agriculturists have in addition to take outside loans.

(iii) I am of opinion that measures should be taken to facilitate the redemption of mortgages, and to cancel the debt after payment of interest equal to the original principal as well as the principal itself.

(*c*) Measures should be taken to restrict or control the credit of cultivators, such as limiting the right of mortgage and sale.

QUESTION 7.—FRAGMENTATION OF HOLDINGS.—(*a*) It is true that there is loss in agricultural efficiency attendant upon the excessive sub-division of holdings. In order that such things may not occur, measures should be taken providing for the owners of adjacent holdings having the right of pre-emption. Then, only, such fragmentation of holdings will decrease.

(*b*) The obstacles in the way of consolidation of holdings are—

The agriculturists, whenever they are in need of money, split up their land and sell or mortgage a portion to the moneylenders.

In order that such things may not take place, measures should be taken providing that, in transactions of mortgage and sale of paddy land, only the owners of adjacent holdings should have the right of pre-emption.

(*c*) Yes, I consider legislation necessary to deal with minors, etc.

QUESTION 8.—IRRIGATION.—(*a*) The districts in Burma in which new irrigation schemes should be adopted are—

(1) Shwebo, (2) Mandalay, (3) Kyauksè, (4) Meiktila, (5) Thazi, (6) Pyawbwè, (7) Yamèthin, (8) Minbu, (9) Myingyan and (10) Pakôkku. It is more suitable to adopt such schemes in the said districts. Except in Myingyan and Pakôkku, irrigation schemes are in operation. New canals should be constructed in Pakôkku and Myingyan districts and arrangements for irrigation should be made there. In the eight districts in which irrigation schemes are being adopted, there is still great need for extension or improvement in the existing methods of irrigation.

(*i*) It is necessary to make arrangements for extension or improvement of perennial and non-perennial canals for storage of water.

(*ii*) It is desirable to make arrangements for extension or improvement of tanks and ponds.

(*iii*) It is desirable to dig wells on high land.

The obstacles to the extension or improvement of irrigation are—
(1) hilly districts and (2) sandy districts.

(*b*) The *ya* and paddy cultivators are supplied with water from canals. I am not satisfied with the existing methods of distributing canal water to cultivators.

Methods which should be employed to prevent wastage of water by evaporation and by absorption in the soil are—

Arrangements should be made in the irrigation district (1) to have reservoirs in existence and (2) to cultivate gardens and plant large trees.

For the fair and equitable distribution of water to the cultivators of paddy and *ya* lands lying within the area irrigated by a canal, the method adopted is to distribute water by means of concrete pipes of dimensions proportionate to the area irrigated. So far this method has not yet been attended with any success. To improve the distribution of water so as to ensure fairness and equity, arrangements should be made to regulate the period for supply of water according to the area of land and the quantity of water used, and to ensure reliability in the opening and closing of the distribution pipes (sluices). The officers of the Canal Department should be made to do their duty according to the rules and regulations without taking bribes, and the agriculturists should be made to understand the methods of distribution of water.

QUESTION 9.—SOILS.—(*a*) (*i*) Water should be drained from low-lying land. Canals should be constructed and irrigation water conveyed to the areas having homogeneous tracts of coarse soil. The soil then gets mixed up with silt and by this means soils can be improved.

(*ii*) Alkali (*usar*) or other unculturable land can be reclaimed by mixing with sand and silt or with soil composed of some other matter. The process of mixing up can be facilitated only after a canal is cut and water is let in and out.

(*iii*) For preventing erosion of surface soil by flood-water, arrangements should be made to stop or deviate the natural watercourses, or to store up water.

(*b*) (*i*) Soils which, within my recollection, have undergone marked improvement are the tracts which are under paddy and *ya* cultivation by means of irrigation.

Water is one of the principal fertilisers of soil and also the distributor of silt and minerals that are carried down from other places.

(*ii*) Soils that have suffered marked deterioration are the hot and dry paddy and *ya* lands that are left fallow and the lands situated in the dry sandy tracts where there is scarcity of water. In dry and hot tracts, as no rain water can be obtained and no trees grow or thrive, no green manures can be obtained.

(*c*) The measures which Government should take to encourage the reclamation of areas of cultivable land which have gone out of cultivation are—

(1) To irrigate those areas which admit of irrigation.

(2) In the case of high lands which do not admit of irrigation, by suggesting a change of crops, by the cultivation of crops suitable to such areas and by practical demonstrations as an experiment.

QUESTION 10.—FERTILISERS.—(*a*) In my opinion, greater use could be profitably made of natural manures or artificial fertilisers. It would be well if the cultivators had faith in, and understood, the methods of using them. This can only be achieved by demonstrations.

(*b*) The adulteration of fertilisers can only be prevented by the examination and analysis of chemical experts who are well versed in the process of preparation and blending of the same.

(*c*) Arrangements should be made to popularise new and improved fertilisers by making the cultivators realise, by means of demonstration, the marked improvement in the growth of crops sown on manured land.

(*d*) There are no localities in Burma in which a considerable increase in the use of manures has recently taken place.

(*e*) The effect of manuring with phosphates, nitrates, sulphate of ammonia and potash manures is not known as these things are not used here in Burma.

(*f*) To discourage the practice of using cowdung as fuel, arrangements should be made to explain the usefulness of cowdung as manure and to instruct the cultivators on its use as such.

QUESTION 11.—CROPS.—(*a*) (*i*) To improve the existing crops, manuring and punctual cultivation of crops according to season should be adopted.

(*ii*) New crops, including fodder crops, should be introduced by demonstration.

(*iii*) The distribution of seeds can be facilitated, if the agriculturists are made to realise the high prices fetched by crops as a result of using good pure seed.

(*iv*) With regard to the prevention of damage by wild animals, this can only be done by the Local Government in some parts where much damage is caused.

(*b*) I want to suggest the cultivation of some heavy yielding food crops in replacement of the present crops. The fertility of the soil in any locality should be examined and the crops most useful in Burma, as well as those used in foreign countries, should be grown.

(*c*) In improving crops or substituting more profitable crops, only those who have received instruction from experts in such methods of agriculture would be successful.

QUESTION 12.—CULTIVATION.—(*i*) The existing systems of tillage are very defective. It is necessary to manure the soil and to get a longer period of tillage before dry crop cultivation, as such cultivation tends to deteriorate the soil. As regards tilling instruments, those made under the new methods should be used in preference to those made under the old methods.

(*ii*) The customary rotations of mixtures of the more important crops should be adopted. But it is still necessary to instruct the agriculturists on the mixtures of crops consisting of tall trees, plants and creepers, the cultivation of crops with regard to the periods for planting and their period of blossoming and bearing fruit.

QUESTION 13.—CROP PROTECTION, INTERNAL AND EXTERNAL.—(*i*) The existing measures for protection of crops from external infection, pests and diseases are not yet effective and sufficient.

There are few agriculturists who understand how to select and store up seed-grain, to clear and remove bushes, creepers and trees close by their paddy and *ya* cultivation wherein insects could take refuge, the fact that insects breed in impure soils, and the profitable methods of cultivation. Arrangements should be made to instruct them in these matters.

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(*ii*) The adoption of internal measures against infection is desirable. As at present the agriculturists have not anly not adopted the methods suggested by the Agricultural Department but have also not yet adopted the very easy method, in common use amongst themselves, measures should be taken to give them instruction in these methods by practical demonstration.

QUESTION 14.—IMPLEMENTS.—(*b*) With regard to the steps that may usefully be taken to hasten the adoption by the cultivator of improved implements, I am of opinion that as the agriculturists have to work their land mostly by means of cattle in Burma, the use of their present implements results in lessening of energy, loss of time and poverty of outturn. Therefore they will get on better with their work, if they make use of implements by which a greater amount of work can be done in less time.

(*c*) There are some difficulties which manufacturers have to contend with in the production of agricultural implements and their distribution for sale throughout the country. To remove such difficulties, I would suggest that the Local Government should make arrangements to provide the agriculturists with funds to enable them to buy agricultural implements easily and to have them repaired immediately when necessary.

QUESTION 15.—VETERINARY.—(*a*) The Civil Veterinary Department should be under the Director of Agriculture and should not be independent.

(*b*) (*i*) Dispensaries are under the control of local district boards. It is not proper to keep them under the local district boards.

(*ii*) The need for expansion is not being adequately met.

(*iii*) I would advocate the transfer of control to provincial authority.

(*c*) (*i*) Agriculturists do not make full use of the veterinary dispensaries. Agriculturists will make use of the veterinary dispensaries if they are under the control of the Director of Agriculture.

(*ii*) Agriculturists do not think that touring dispensaries distribute medicines without charges; as it appears that the Veterinary Assistants do not tell them anything about free distribution, they do not make use of it.

(*d*) The obstacles met with in dealing with contagious diseases are due to the arrangements made by the Veterinary Assistants who are generally partial in their dealings and take bribes. I do not advocate legislation dealing with notification, segregation, disposal of diseased carcasses, compulsory inoculation and prohibition of the movement of animals exposed to infection. If the Civil Veterinary Department were an authoritative head under the control of the Director of Agriculture, I think this separation of functions would improve the existing conditions.

(*e*) There is no difficulty in securing sufficient serum to meet the demand now.

(*f*) With regard to popularising preventive inoculation, the Veterinary Assistants do not explain matters but use such powers as would tend to act as obstacles in the way of treatment. Though no fee is publicly demanded for such inoculation, it has been customary to pay without fail, and this acts as a deterrent.

(*g*) (*i*) & (*ii*) Yes, I consider that the provision of further facilities for research into animal disease is desirable.

Such further facilities should take the form of—

(*i*) an extension of the Muktesar Institute, or

(*ii*) the setting up of provincial veterinary research institutions.

(*h*) (*i*) & (*ii*) I recommend that special investigations should be conducted by—

(*i*) Officers of the Muktesar Institute, or

(*ii*) research officers in the Provinces.

(*i*) I recommend the appointment of a superior Veterinary Officer with the Government of India.

I am of opinion that the appointment of such an officer conducting all researches and investigations would result in improving the health and in increasing the number of animals, as Burma is a country where only animals are employed in cultivation.

QUESTION 16.—ANIMAL HUSBANDRY.—(*a*) (*i*), (*ii*) & (*iii*) Arrangements should be made regarding (*a*) age-limit for labour and (*b*) time-limit for labour according to season and time fixed for food and drink.

(*b*) (*i*) *to* (*v*) Special arrangements should be made to prevent the existing causes of injury to cattle.

(*c*) The months of the year in which fodder shortage is most marked in our districts are the months of *Tabaung, Tagu, Kason and Nayone* (March to June).

Such scarcity of fodder usually exists for 120 days. After this period of scarcity ends, about one month elapses before young growing cattle begin to thrive.

(*d*) I suggest the following for improving or supplementing the fodder supply in our district:—

(1) To increase the number of pastures in forest reserves.

(2) To take strict measures not to burn straw and dry grass in the pastures in the dry season.

(3) To construct weirs in fisheries, streams and channels and to store up water.

(*e*) Landowners should be induced to take a keener practical interest in these matters by instructing them on the subject of grazing grounds for tenants' cattle and on the methods of collection and storage of fodder.

QUESTION 17.—AGRICULTURAL INDUSTRIES.—(*a*) The work done by an average cultivator on his holding during the year occupies about eight months. The cultivator who has got sufficient foodstuff in store would do manuring work, chop down and clear jungle or under-growth, set up a weir or dig a channel on his holding in the slack season. As soon as he finishes this work, he would ply a cart for hire or be employed as a cooly.

(*b*) I want to suggest means for encouraging the adoption of subsidiary industries. Arrangements should be made to enable the cultivators to continue cultivating cold and hot season crops on the damp areas and on the areas where water is available in the hot season. I want to suggest some new subsidiary industries which could be established with Government aid, to occupy the spare time of the family.

(*c*) There are no obstacles in the way of expansion of such industries as bee-keeping, poultry-rearing, fruit-growing, sericulture, pisciculture, lac-culture, rope-making, basket-making, etc.

(*d*) Yes, I think that the Government should do more to establish industries connected with the preparation of agricultural produce for consumption, such as, oil-pressing, sugar-making, cotton-ginning, rice-hulling, utilisation of wheat-straw for cardboard, utilisation of cotton seed for felt, fodder, oil and fuel, utilisation of rice-straw for paper, etc.

(*e*) Subsidiary employment could be found by encouraging industrial concerns to move to rural areas. In this connection I would suggest taking the initiative in the establishment of industries in rural areas.

(*f*) Yes. I recommend a more intensive study of each rural industry in its technical, commercial and financial aspects with a view, among other things, to the introduction of improved tools and appliances.

(*g*) With regard to measures which might lead to greater rural employment, I would suggest that special arrangements should be made by the Local Government, as required, for various kinds of employment according to the village tracts.

(*h*) With regard to means whereby the people could be induced to devote their spare time to improving the health condition of their environment, I would suggest that they should be induced to do so by teaching them how to take up physical exercises and pointing out their beneficial effects.

QUESTION 18.—AGRICULTURAL LABOUR.—(*a*) Measures which should be taken to attract agricultural labour from areas in which there is a surplus to areas under cultivation in which there is a shortage of labour are to encourage (*a*) co-operative credit loans and (*b*) agricultural loans. Measures which should be taken to attract agricultural labour from areas in which there is a surplus to areas in which large tracts of cultivable land remain

uncultivated are (*a*) allotment of land enough for cultivation as a separate holding and (*b*) loans issued by the Local Government for investment in cultivation.

With regard to suggestions designed to relieve seasonal unemployment, there is now a practice of migration of the agricultural population.

(*b*) There is a shortage of agricultural labour in this Province of Burma. This may be attributed to insufficiency of funds for investment in cultivation. If the Local Government make arrangements to advance loans to agriculturists so as to enable them to invest a sufficient amount of money, the number of agriculturists will increase.

QUESTION 19.—FORESTS.—(*a*) No. I do not consider that forest lands, as such, are at present being put to their fullest use for agricultural purposes.

I would suggest immediate arrangements to be made to grant (1) extensions of cultivable forest areas; (2) grazing facilities for adequate supply of fodder to agriculturists and (3) licences to extract timber and bamboo for making tools and appliances used by agriculturists for constructing dwelling houses and cattle-sheds, and for firewood. These should be granted and extended as much as they want.

(*b*) My suggestion is that the forest areas in the neighbourhood of agricultural localities should be in proportion to the number of cattle.

(*c*) There is no instance of soil erosion on account of deterioration of forests.

There is no instance of soil erosion and damage from floods.

(*d*) I want to indicate (some) methods by which the supply of moisture in the soil, the rainfall and supply of canal water can be increased and regulated by afforestation or by the increased protection of forests so as to benefit agriculture. Arrangements should be made to plant trees also in the village tracts of the agriculturists and measures should be taken to protect existing trees.

These methods are useful in preventing the destruction of agricultural land by erosion.

(*e*) There is an opening for schemes of afforestation in the neighbourhood of villages.

(*f*) Forests are not suffering deterioration from excessive grazing. Soil erosion cannot thereby be facilitated.

QUESTION 20.—MARKETING.—(*a*) I do not consider existing market facilities to be satisfactory. The object should be to put Burmans into direct touch with foreign merchants in respect of the sale of crop produce, timber and other commodities of Burma.

In such sales, I would suggest that measures should be taken to establish direct transactions between the producers and the merchants.

(*b*) I am not satisfied with the existing system of marketing and distribution. I cannot be satisfied with the present system in which the producers have to sell beforehand at the places where the various kinds of crops are produced, because the system is not at all productive of any advantage to the agriculturists.

The agriculturists in Burma have not money enough for cultivation expenses at the time of preparing the land for sowing and are obliged to sell the produce beforehand to the well-to-do people at a low price. When the creditor collects the crop at harvest time, the price comes up even to Rs. 50 per cent profit within eight months and so the well-to-do people get on. In three or four months there come sale transactions between the creditors and merchants. Then, what originally cost the creditor Rs. 100 is worth Rs. 75 more and is sold to the merchant; the merchant now sells the same at the rate of Rs. 50 per cent profit to a foreign country. The result is that the producers of Burma are getting only one-third of the price paid by the foreigners.

I wish to make the following suggestions: If steps be taken to keep the producers or cultivators in sufficient funds to obviate the expediency or necessity of making "advance" sales at the cultivation season, and thus enable them to sell their produce to the traders direct at the time of harvest at the prevailing market price, the producers will be greatly benefited.

(*d*) I am of opinion that more effective steps might be taken to place at the disposal of cultivators, merchants and traders information as to market conditions, whether Indian or overseas, crops returns, complaints as to Indian produce from wheresoever originating and agricultural and marketing news in general.

QUESTION 21.—TARIFFS AND SEA FREIGHTS.—The existing custom duties, both import and export, and sea freights do affect the prosperity of the Indian cultivator adversely.

As a remedial measure for the amelioration of, and relief from, this undesirable state of affairs, I wish to suggest that the levying of customs duties on both import and export and custom duties on sea freights should be stopped, and free trade should be permitted.

QUESTION 22.—CO-OPERATION.—(*a*) (*i*) & (*ii*) To encourage the growth of the co-operative movement the steps as stated below should, I think, be taken by (*i*) Government and (*ii*) non-official agencies:—

(*i*) Steps should manifestly be taken by the Government to take notice of, and look into, the matters of the occupation and work of the members of co-operative societies, their taking of loans and repayment of the same in localities where co-operative societies have been formed, and to see that the touring officers pay attention to these matters.

(*ii*) The steps that should be taken by the non-officials to encourage the growth of the co-operative movement are: the reposing of trust and confidence in the members of the societies, having dealings with them and rendering help and assistance to them.

(*b*) (*i*) Special steps should be taken to see that, as regards the credit societies, the grant of loans and repayment are made punctually at the periods fixed.

(*ii*) Steps should be taken for the purchase societies to be linked up with the cultivators so that they can dispose of their produce either in a foreign or home market, and reap benefits thereby.

(*iii*) Societies formed for the sale of produce or stock are not yet in existence in Burma; I am of opinion that the formation of such societies is advisable.

(*iv*) Societies for effecting improvements, *e.g.*, the digging of wells and the construction of *bunds*, walls and fences, or the planting of hedges, are not in existence in Burma; I am of opinion that it would be advisable to form such societies by way of an experiment.

(*v*) It is advisable that a society for the aggregation of fragmented holdings, and their redistribution in plots of reasonable size, should be formed.

(*vi*) The scope of co-operative credit societies should be extended so as to include the co-operative use of agricultural machinery as an additional object in each society.

(*viii*) Steps should be taken to popularise such societies by their formation by way of experiment.

(*c*) With regard to the co-operative schemes for joint improvement, such as co-operative irrigation, co-operative fencing or a co-operative consolidation of holdings scheme, which cannot be given effect to owing to the unwillingness of a small minority to join, legislation should be introduced in order to compel such persons to join for the common benefit of all.

(*d*) So far there is nothing yet to lead me to consider that those societies of which I have personal knowledge have, in the main, achieved their object.

QUESTION 23.—GENERAL EDUCATION.—(*a*) (*i*) As the seeking of higher or collegiate education has in view the sole object of securing highly paid appointments, it should be compulsory on those who have passed out of such schools or colleges to serve in the Agricultural Department for one year to undergo a course of training in agriculture before they are transferred to other departments.

(*ii*) & (*iii*) In middle schools and elementary schools, agriculture should form a distinct and special subject of instruction in the curriculum; and promotion to a higher class should only be given after a pass in the subject of agriculture.

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(*b*) (*i*) The methods I wish to suggest whereby rural education may improve the ability and culture of agriculturists of all grades, while retaining their interest in the land, are as follows:—

Agriculture should form a subject of instruction in rural education; it should be laid down that it is a subject which is to be passed in fact and should be compulsory.

(*ii*) With regard to education in rural areas, there is no such thing as compulsory education in Burma.

(*iii*) The small proportion of boys in rural primary schools passing through the fourth class is due to the fact that the parents have very little desire for their children to acquire education, to the fact that they are made to assist their parents in their work and also to the fact that children who are not required to give assistance to their parents are made to lead a sheltered, contended and happy life.

QUESTION 24.—ATTRACTING CAPITAL.—(*a*) With regard to the steps that are necessary in order to introduce a large number of men of capital and enterprise to take to agriculture, the science of agriculture should be imparted to them and the benefits to be derived from an agricultural occupation or calling should be made apparent to them.

(*b*) The factors which prevent the owners of agricultural land from carrying out improvements are the indiscriminate ways in which agricultural lands are let and made to change hands from one tenant cultivator or set of tenant cultivators to another.

QUESTION 25.—WELFARE OF RURAL POPULATION.—(*a*) With regard to improving hygiene in rural areas, the Local Government should look into, and take steps and make regulations regarding, such matters as the building of houses in rural areas, breeding or keeping of cattle on the principal or main roads, the modes or customs of eating and living and the free use of water where water-supply is sufficient and ample. With regard to the promotion of the general well-being and prosperity of the rural population, steps should be taken to instil into the minds of the people the desirability of learning the arts or trades according to the needs and requirements of the locality, to encourage and assist them in such trades or callings and to establish them in the methods of thrift and saving.

(*b*) I am in favour of Government conducting economic surveys in typical villages with a view to ascertaining the economic position of the cultivators. The scope and methods of such enquiries should be as follows:—

(1) To distinguish as to whether an agriculturist is or is not a member of a co-operative society, is doing his work independently of any such society or has dealings with other capitalists.

(2) To distinguish between the landlords who personally work their own lands and those who work the lands on payment of rent.

(3) To appoint such a surveyor and an officer in each township.

(4) To make a survey once a year.

(5) At the end of each year, a report should be compiled, with a memorandum giving the state of progress made, and the same should be made known to all the people in the township.

(*c*) As a result of enquiries made by me as far as possible, I have arrived at the following general conclusions:—

(1) The agriculturists are wont to follow the hereditary callings and occupations of their parents.

(2) They have no faith in, and do not follow, the practice of cultivating the crops in rotation and according to the seasons.

(3) In the matter of raising loans they show an utter disregard for the amount of harm caused to them and have formed the habit of borrowing loans at high rates of interest and on the mortgage of their property.

(4) In the matter of expenditure they are reckless and extravagant, and without any practice of economy.

(5) Without keeping an account of their daily, monthly and yearly incomes and forming a budget estimate thereof, they have a habit of incurring expenditure on mere guesses.

QUESTION 26.—STATISTICS.—(*b*) The area of reserved forest in Burma should be ascertained. Statements of areas of cultivable land left uncultivated, and which can be used for cultivation, should be worked out.

U YIN GALE, Representative of Co-operators of Upper Burma.

Replies to the Questionnaire.

QUESTION 22.—CO-OPERATION.—(*a*) (*i*) The following steps should be taken by Government:—

The existing co-operative credit societies in Burma not having made the progress they should have made, a committee of enquiry should be appointed to inquire into the causes of their decline. Every encouragement for further progress should be given when the real causes are found out.

The facts are as follows:—

(*a*) The majority of the members of the societies are Buddhists.

(*b*) According to their religion, they possess the following virtuous characteristics, *viz.*, love, smypathy and joy in the happiness of others.

(*c*) Most of them are literate.

(*d*) Most of them are related to one another.

(*e*) Generally they follow the same kind of profession, such as agriculture.

(*f*) In previous years, the number of societies has increased because people are keenly in favour of co-operation, most of them being of the five types mentioned above. Besides, according to the existing by-laws, all societies are unlimited liability societies and liability for loans is enforced jointly not only on the members of the society but also on the union, to the extent of the full amount of the outstanding loan or of half the share capital of the societies concerned.

(*g*) At present the societies are not progressing as they ought to. It is, therefore, advisable to hold an enquiry to ascertain the cause of their decline. Also in the future, similar enquiries should be held in each Province every ten years.

(*h*) In order to promote the co-operative movement and in order that co-operative societies may be acquainted with one another, conferences should be held at least once in two or three years so that societies may act on the resolutions passed, and benefit by them.

(*i*) The Registrars of the Co-operative Department should be thoroughly acquainted with Burma and the co-operative movement, should take an interest in the co-operative work and should be kept on for at least for twelve years. It should be arranged not to have frequent transfers.

(*j*) Arrangements should also be made to enable co-operative societies to deposit their money with Government treasuries and sub-treasuries, to withdraw from them and to remit money by transfer.

(*k*) The rate of interest taken by the banks from the societies and the rate taken by the societies from their members having now become excessive, it should be reduced in the following ways:—

(1) Government should issue loans at a low rate of interest.

(2) Government should intervene to reduce the interest on deposits.

(3) Government should give assistance according to the rules, to make the societies economise their expenditure as much as possible or to guide societies in regard to their financial position.

(4) The banks should be given a wider discretion to enable them to loan money to societies according to their credit.

(*l*) Payment of revenue should be postponed till the 30th June in order that the produce of the societies may be sold at more reasonable prices.

(*m*) Repayments of loans may be spread over several years to enable members of societies to repay punctually money taken for redemption of their lands, for purchase of lands, for additional loan taken on the security of the lands and for old debts.

(*n*) Government should, to promote the success of the experimental societies besides the old established ones, assist them by advice and by pecuniary help.

(*o*) The lands which members of societies have inherited from their forefathers should not be auctioned but a law should be provided for repayment of the loans over a period of several years so that members may never fail to redeem their lands.

(*ii*) Non-officials should help in the following ways:—

(1) By the formation of societies to spread knowledge of the co-operative movement.

(2) By the issue of a co-operative newspaper.

(3) By the establishment of savings banks at the township and district headquarters.

(4) By opening schools to impart knowledge of co-operation and agriculture, or by having a temporary itinerant teaching staff for the purpose.

(5) By the formation of a central body to work for the success of the co-operative movement and of the societies, or for the benefit of the Province as a whole.

(6) By bringing the urban and rural societies into closer touch, so that the urban societies may act as savings banks for the deposit of the savings of the rural society members, so that the repayments due by rural societies at the time of harvest may be repaid punctually, and so that the urban societies may be able to undertake the storage of the produce of the members of the rural societies in order to obtain a better market for the produce and to obtain commission on the sale of the same.

It is desirable, in order to enable the people to do other subsidiary work between two agricultural seasons, that arrangements should be made in consultation with district officers and co-operative officers to secure work in connection with contracts for public works, pertaining to roads and irrigation, of such bodies as district councils, municipalities, etc.

Arrangements should be made to enable work to be done in connection with the supply of timber, sleepers, firewood and bamboos to the railway company and such other companies which are concerned with big undertakings.

To improve the weaving industry among women, arrangements should be made to encourage the industry by giving facilities for the purchase of improved looms of moderate price and to spread the knowledge of weaving.

(*b*) (*ii*) I have no knowledge of purchase societies. However, the village co-operative credit societies are ready to purchase the seed-grains such as paddy, cotton and pulses which agriculturists have to actually use. I am of the opinion that such a project may not be successful if there are no big shops or societies to undertake the sale of seed-grains. It will be successful if, in consultation with officers of the Agricultural and Co-operative departments, and with the assistance of Government shops run on co-operative lines for selling seed-grains are opened in suitable districts. If the project is successful, Government's further participation will be unnecessary.

(*iii*) It is understood that though societies for the sale of produce or stock were formed in the past, they have become defunct owing to financial reasons. Such societies will be successful only if they can raise loans from district co-operative banks or company-managed banks or the mortgage of their stock-in-trade.

(*vi*) If the Agricultural Department can undertake the advertising and demonstration of the use of suitable agricultural machinery, societies should be formed for the purchase of such machinery and arrangements should be made for the purchase or hire of the same by members of co-operative societies.

(*vii*) The Registrar should give advice on the ways and means of joint farming. Then only is there the possibility of societies springing up to give such farming a trial. At present, members of the co-operative societies are following the methods of mutual help in agricultural operations as adopted since the time of their ancestors.

(*viii*) It is advisable that Registrars of the Co-operative Department should circulate notes, giving advice in connection with the methods to be adopted by cattle-breeding societies, suitable to Buddhists as well as to others of different faiths. Then only there will spring up societies which will be willing to give cattle-breeding a trial. At present cattle-breeding is left to individual enterprise.

(*ix*) Arrangements should be made by Registrars of the Co-operative Department to form industrial and handicraft societies, cash saving societies, etc., in which housewives should join.

U NYUN, Representative of Co-operators of Upper Burma.

Replies to the Questionnaire.

QUESTION 2.—AGRICULTURAL EDUCATION.—(*i*) There are no teachers and institutions as yet.

(*ii*) There is an urgent need.

(*iii*) Teachers should be appointed for agricultural education.

(*v*) Recreations for lads should be arranged.

(*vi*) No agricultural education is yet given.

(*vii*) Modification is called for, to impart practical agricultural education side by side with the theoretical.

(*viii*) (*a*) Nature study is taught; schools which have items (*b*) and (*c*) are not in existence in my locality.

(*ix*) As there are no institutions, cultivators still follow their old pursuits.

(*x*) The allotment of waste jungle lands under *patta* (*i.e.*, leased land) with periods of exemption from land revenue will make agriculture more attractive to them.

(*xi*) There has been no movement for improving technical knowledge as there have been no students who have gone in for agricultural studies.

(*xii*) If agricultural schools are opened in rural tracts, adult education will be advanced.

(*xiii*) The administration of schools should rest with the school committees and teachers, subject to the control of the Government and grants-in-aid for schools should be given by the Government.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(*a*) By using good and pure seeds distributed from the Agricultural College and by the advice given to use some sort of mechanical plough, known as *Gwin-set* (revolving harrow), extensive areas can be cultivated and outturns of crops increased.

(*b*) There may be means for increasing the effectiveness of field demonstrations.

(*c*) Cultivators may be induced to adopt expert advice if practical demonstration is given in the presence of the cultivators.

(*d*) Failure of demonstration in certain places was due to unlevel ground and insufficiency of irrigation canals.

QUESTION 4.—ADMINISTRATION.—(*a*) No suggestions, but the writer wishes to indicate directions in which Government of India may supplement the activities of the Local Government.

(*c*) No. The Government should grant the requests made by the Co-operative and Agricultural Conference.

QUESTION 5.—FINANCE.—(*a*) The method of financing adopted by the co-operative societies still requires to be modified and the Government should give closer supervision and more assistance than at present.

(*b*) It would be advisable if time for repayment of loans were extended for *bona fide* cultivators and if officers were empowered to lend out a larger amount of loans than at present.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—(*a*) (*i*) The irregularity of rainfall, the destruction of crops by insects, the death of cattle from disease and the small profit obtained by the cultivators are the main causes of borrowing.

(*ii*) The sources of credit are co-operative credit societies, the Government, the *chettiar* firms and some wealthy people in the villages.

(*iii*) The reasons preventing repayment are the excess of expenditure over income due to less profit even when there is no destruction of crops, and high prices for articles required by cultivators.

QUESTION 7.—FRAGMENTATION OF HOLDINGS.—(*c*) Legislation is required and it would be fair if arbitrators and village committees are empowered to decide disputes.

QUESTION 8.—IRRIGATION.—(*a*) (*i*) New canals should be constructed in Meiktila, Myingyan and Sagaing districts for irrigation with the water of the Paung-laung river by which Kyaukse district is at present irrigated. The perennial canals are often flooded, with consequent destruction of crops. Steps should be taken to prevent such floods.

(*b*) I am not satisfied. The department concerned can complete from 15th November to 15th March the necessary repairs and improvements in the existing canals. If distribution of water by turn is started from 16th March to the end of May, it will help *hnan-yin* (early sesamum), *kauk-yin* (early paddy) and plantains. If the water were to be distributed for *kauk-kyi* (main crops) from 1st June, the agriculturists would be able to extend their cultivation.

QUESTION 9.—SOILS.—(*a*) (*i*) Low-lying areas should be provided with canals for supply of water and drainage.

(*ii*) The advice of the Agricultural Department should be sought to deal with such lands.

(*iii*) The banks of the main canals and feeders should be raised.

(*b*) (*i*) I can give instances. The soil of the lands in our district is improved yearly as they are covered with silt when the canals overflow their banks.

(*ii*) The soil of lands which are irrigated by the water of the natural watercourse deteriorates. Consequently the cultivation has to be done in alternate years.

(*c*) *Bunds* should be constructed for the protection of low-lying lands. Lands for which water cannot be obtained in the cultivating season should be artificially irrigated, and leases embodying certain periods of exemption from assessment of land revenue should be issued.

QUESTION 10.—FERTILISERS.—(*a*) No other fertilisers except cowdung and silt are used.

(*b*) Fradulent adulteration of fertilisers is not known.

(*e*) No. Such manures are not used.

(*f*) Firewood and charcoal should be used as fuel.

QUESTION 11.—CROPS.—(*a*) (*i*) To ensure improvement, the agriculturists should grow special crops solely for the purpose of seed-grain.

(*ii*) Paddy stubbles, *jowar* stalks and bean husks are used as fodder. No other fodder crops are cultivated.

(*iii*) Until it is generally known that a supply of seeds is obtainable from the Agricultural Department, each district should be provided with a depot for the distribution of seeds suitable for the district.

(*iv*) Wild animals are scared away by means of shooting with bows and arrows, by display of torches and by the beating of tin drums.

(*c*) The *Nga-sein-gyi*, a variety of long-lived paddy which is cultivated at the suggestion of the Agricultural Department, is successful.

QUESTION 12.—CULTIVATION.—(*i*) The plough known as "Gwin-set" is used in our district. The "Gwin-set" plough is a great improvement on the old implements in place of which it is used.

(*ii*) There is no practice of cultivating rotation or mixture of crops.

QUESTION 13.—CROP PROTECTION, INTERNAL AND EXTERNAL.—(*i*) The existing measures for protection of crops are not sufficient.

(*ii*) No internal measures against infection have been adopted as yet.

QUESTION 14.—IMPLEMENTS.—(*a*) No suggestion, except the use of a mechanical weed cutter.

(*b*) There should be exhibitions of samples of improved implements besides the improved plough referred to before.

(*c*) No.

QUESTION 15.—VETERINARY.—(*a*) The Civil Veterinary Department should be under the Director of Agriculture.

(*b*) (*i*) & (*ii*) There are no such dispensaries in my district.

(*iii*) If there were dispensaries they should be transferred to the provincial authority.

(*c*) (*ii*) Yes.

(*d*) Legislation dealing with preventive measures is advocated.

(*e*) If the animals are inoculated wholesale on occasions of outbreaks of cattle disease, there will be difficulty in securing sufficient serum to meet the demand.

(*f*) No fee is now charged for preventive inoculation. Preventive inoculation is not popular, because some people have no faith in its efficacy.

(*g*) Not desirable.

QUESTION 16.—ANIMAL HUSBANDRY.—(*a*) (*ii*) There is no dairying industry in my district; therefore no suggestion is necessary.

(*iii*) The existing practice in animal husbandry should be improved.

(*b*) (*i*) There is no species of grass particularly for bullocks.

(*ii*) There are no enclosed pastures in my district.

(*iii*) Fodder is sufficient in my district.

(*iv*) There are no green fodders in dry seasons.

(*v*) There are no feeding stuffs for cattle except seeds and leaves of *pebyugale* which contain mineral constituents.

(*c*) Fodder is scarce in the months of *Tazaungmon* (October-November) and *Nadaw* (November-December) for eight weeks. The young cattle begin to thrive in the months of *Pyatho* (December-January) and *Tabodwe* (January-February).

(*d*) Fodder is sufficient in my district and therefore no suggestion is necessary.

(*e*) It is not necessary to induce the landowners to take a keener practical interest in these matters.

QUESTION 17.—AGRICULTURAL INDUSTRIES.—(*a*) In my district many kinds of crops are cultivated and therefore the field season continues throughout the year.

(*b*) No suggestion is necessary.

(*d*) Yes, Government should do more.

(*h*) Conditions of low-lying marshy lands should be improved so as to get pure fresh air.

QUESTION 18.—AGRICULTURAL LABOUR.—(*a*) (*i*) Government should take measures to get rid of malaria from areas where there is shortage of labour, so as to attract agricultural labour.

(*ii*) In areas where there are large tracts of cultivable land remaining uncultivated, new villages should be established with temporary dispensaries to get rid of malaria. Grants or *pattas* should also be issued, with appropriate periods of exemption from payment of revenue.

(*b*) As there is no shortage of agricultural labour in my neighbourhood, no suggestion is given.

(*c*) Besides the measures adopted by Government in colonisation areas of Myitkyina district, I cannot suggest any other measures that would facilitate the development of areas not under cultivation.

U Nyun]

QUESTION 19.—FORESTS.—(*a*) Reserved forest lands where there are no big trees, and which are cultivable, should be thrown open for agricultural and grazing purposes.

(*b*) If the above measures are adopted, there will be a sufficient supply of firewood and fodder available to the agriculturists.

(*c*) As there are no large trees in the forests, water from the hills runs down rapidly and floods the paddy lands. The condition of natural water-courses and drainage channels should be improved.

(*d*) Rain-water will flow down slowly and rainfall will increase by systematic afforestation at the sources of large rivers.

(*e*) There is no opening for schemes of afforestation in the neighbourhood of villages.

(*f*) As there are no grazing grounds in reserved forests as yet, no forests suffer from deterioration on that account.

QUESTION 20.—MARKETING.—(*a*) I am not satisfied with the existing market facilities because cultivators who earn their living by cultivation derive small profit from their produce. However, I cannot give suggestions for their improvement.

QUESTION 22.—CO-OPERATION.—(*a*) (*i*) To encourage the growth of the co-operative movement, Government should take charge of the present Co-operative Council.

(*ii*) Instead of leaving the responsibilities entirely in the hands of non-official agencies, Government should take charge of and encourage the Council's activities.

(*b*) (*i*) As regards the credit societies, the rates of interest on deposits given by the Provincial Bank are high. For the liquidation of short-term deposits Government should deposit money needed by the bank at the lowest possible rate, and for as long a period as possible.

(*ii*) No purchase societies are in existence at present.

(*c*) I do not think it will be feasible to compel unwilling persons to agree to co-operative irrigation by legislation.

(*d*) I do not think that the societies have succeeded as yet.

QUESTION 23.—GENERAL EDUCATION.—(*a*) (*i*), (*ii*) & (*iii*) I do not think that the education imparted is sufficient for the agricultural efficiency of the people.

(*b*) (*i*) If agricultural education were imparted in various schools and there was practical success in respect of agriculture and gardening in the shape of profits, there would be hope for improvement.

(*ii*) There is no compulsory education in rural areas. It will be feasible to make it so in suitable places.

(*iii*) There are few who pass the fourth class because they are made to leave the school as soon as they learn how to read and write, because the subjects in which the parents are interested are not included among those taught and because the parents are poor.

QUESTION 24.—ATTRACTING CAPITAL.—(*a*) The Local Government should give encouragement by imparting agricultural education and by showing the benefits arising out of it.

(*b*) It is due either to excess or want of water.

QUESTION 25.—WELFARE OF RURAL POPULATION.—(*a*) For the promotion of the general well-being and the prosperity of the rural population, they should have clean water, pure air, fresh food and sufficient light.

(*b*) As the time has not arrived, it is not needed.

(*c*) I have not personally made an enquiry.

Oral Evidence.

64805. *The Chairman:* U Shwe, U Yin Gale and U Nyun, you are co-operators, all from Upper Burma?—(*U Shwe*) Yes.

64806. We have read the notes of what you wish to say; we propose to ask you some questions about co-operation. I understand that you, U Shwe, will answer for the party, but if your friends do not agree with what you say, I hope they will say so. Do you think that the fact that the liability of members of your credit societies is unlimited has been a good thing or a bad thing?—It has been a good thing.

64807. Are any of you on the committees of your primary societies or credit societies?—All the three of us are chairmen of unions.

64808. Are any of you also chairmen of primary societies, or have you ever been chairmen of primary societies?—All the three of us are chairmen of primary societies and we are also union chairmen. (*U Nyun*) I am chairman of the district association also.

64809. Do you think that the ordinary member of your primary society really understands all about co-operation?—Some do, and some do not.

64810. Do you think it very important that members should understand all about co-operation?—It is important.

64811. Apart from the question of Government assistance and its lowering of the rate of interest, do you think that you have had sufficient help and guidance from officials of the Co-operative Department?—We get help to a certain extent.

64812. Do you think it would be a good thing if you got more good advice and support from the department?—It would be a good thing.

64813. U Nyun, in your note you ask that Government should take charge of the Co-operative Council. What exactly is the Co-operative Council?—The Co-operative Council is the agency for controlling co-operation. At present the Co-operative Council has not got sufficient funds. If the Government can contribute funds towards the management of the Co-operative Council, its management by a non-official agency will become successful.

64814. We have been told that the present state of the primary societies in Upper Burma, in the dry tract, is unsatisfactory. We have been told that it is due partly to a series of bad seasons which have placed the cultivators, the members of the societies, in difficulties as to repayment, and that it has also been due partly to the absence of sufficient official guidance and advice. Can you suggest any other reasons for the disappointing condition of your societies?—(*U Shwe*) The Agricultural Department officers should also try to introduce new and better crops, and the area under irrigation should be extended as far as possible. The co-operative movement ought to be looked after by officials of great experience, and they ought to be attached to the Co-operative Department for a long time. In the cultivation of paddy usually we do not get water in time. We get it in September or October, too late for irrigation.

64815. Do you think that there are many opportunities for carrying out small irrigation schemes such as *bunding* streams or making small ponds, as to which expert advice might be very helpful to you?—Advice would be very helpful.

64816. Do you attempt, before the rains, to break up the surface of your land so as to make it receive and retain the water?—In the district I know well, the cultivators cannot cultivate their land before the rains because the cultivation of land is not the only occupation they have.

64817. Is the other work in connection with timber extraction?—We are doing other work which comes in our way. It is not timber extraction alone.

64818. Do you think that it would be worth while to prepare the land in the way I have described, as an insurance against the risk of light rains?—If it were possible to do such a thing, it would be very good.

64819. *Mr. Calvert:* In your written evidence you have proposed that Government should do certain things which you yourself should be able to do without Government assistance. Why do you think that Government should do things which you can do for yourselves?—I am of opinion that there are certain things which can only be done by Government and that is the reason why I have proposed it.

64820. For instance, you propose that Government should convene co-operative conferences. Why do not the presidents of unions organise these conferences?—In the present circumstances they cannot organise conferences without the aid of Government.

64821. Have any guaranteeing unions been called upon to pay the debts of defaulting societies?—There are some unions which have had to pay.

64822. In your unions are there now societies under liquidation?—Not in our unions; but there are some societies in our district under liquidation.

64823. If you have guaranteeing unions which guarantee to repay the debts of defaulting societies, why has it been necessary to amend the Act so as to enable the Deputy Commissioner to collect the debts?—The unions have no power to enforce payments. Therefore it is necessary for some one with authority to enforce the payment of debts.

64824. Do you mean to say that the unions are of no use in securing repayment?—There is no law in the hands of the union to enforce payment.

64825. Do the unions actually bring about better repayment?—They try to get repayments to the best of their ability.

64826. What actually do they do to bring about better repayment?—They act only according to the rules and by-laws. They have not the authority in their hands to enforce payments.

64827. Can you tell me one instance where a guaranteeing union has brought about repayment from a defaulter?—When the primary societies are taken into the union the property possessed by the members is ascertained, and there is an understanding to the effect that on the society defaulting the members thereof should hand in their property to the union. This practice exists as a rule. As a matter of actual practice the union cannot take hold of the property of the members of the society. They have to go to the civil court for that.

(The witnesses withdrew.)

U YIN GYI, Ohnbin Village, Mahlaing Township.

Replies to the Questionnaire.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(*a*) (1) Planting of seeds in lines with seed drills.

(2) Use of one-sided harrows called *arlein*.

(3) Commencement of the use of iron harrows with five teeth.

(4) Use of good and clean seeds selected and supplied by the Agricultural Department.

(5) Soaking the seeds in water diluted with vitriol in order to prevent *pyaunghaing* disease.

(*b*) If the good methods of ploughing and cultivation adopted by the Government Agricultural Department can be demonstrated directly on the separate *taungthu's ya* lands and if it can be shown how much more profits and how much more benefit may be derived, the *taungthus* will believe and by telling and teaching one another, the new methods can be soon improved.

(*c*) If the previously mentioned methods succeed, the *taungthus* can be easily persuaded by giving them lectures. Although demonstrating the method of planting seeds in lines with seed drills may be successful, it is difficult for the *taungthus* to follow that method. They have no practice in driving the ploughs for scattering seeds and in spreading seeds with them. Moreover it is difficult to change all of a sudden from one method to another.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—(*a*) (*i*) On account of irregular rains the crops are poor. The crops produced fetch a very low price. The proceeds do not come up to the amount that ought to be obtained and the result is that they do not cover even the expenses incurred in the cultivation.

(*ii*) The advances are from the jungle traders, brokers, *chettiars* and the Government.

(*iii*) The cultivators are unable to repay because the yield from their labour is poor and the selling price is low.

(*b*) If the Government open land mortgage banks charging small interest, the *taungthus* will incur less debts.

It is desired that loans may be advanced by the Agricultural Department because the officers of the Agricultural Department know, better than the executive officers of the districts, the time when the *taungthus* desire to have the loans and the actual amounts that may be expended. Moreover, the officers of the Agricultural Department really wish for the prosperity of the *taungthus*.

(*c*) It is not proper to prevent the *taungthus* from mortgaging and selling their own lands.

U LU HMAW, Chairman, The Payitkon Central Co-operative Society, Limited, for the Collection, Sale and Purchase of Seed-Grains.

Replies to the Questionnaire.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(*a*), (*b*) & (*c*) It is advisable for the Agricultural Department to open farms for giving practical instructions to the agriculturists in good and proper methods of cultivation.

(*d*) The extensively successful propagation of good and pure seed-grains of Karachi gram, etc., in Lower Chindwin district.

This is due to the officers of the Agricultural Department first taking the initiative of establishing experimental or exhibition farms in various places, cultivating good, pure seed-grains and demonstrating the superiority of their seed-grains to agriculturists by practical methods.

QUESTION 4.—ADMINISTRATION.—(*c*) (*i*) The activities of the Agricultural and Veterinary departments have brought immense benefits to the agriculturists.

(*ii*) The incidents in the systems of railways and steamers giving cause for dissatisfaction are the unjust demands and exactions made by subordinate officials for wagon and freight charges, etc., from the agriculturists who are transporting their agricultural produce for sale from one place to another by one of these means of transport and the undue and excessive delay in the transport of their goods, occasioning the loss of market and untold evil to the agriculturists.

Another unsatisfactory feature is the enhanced rates in the schedule of freight charges on goods. A reversion to the normal state of affairs with regard to those charges cannot be too strongly urged. The best plan would be for the Government to take over the management of the said railways and steamer services.

(*iii*) For want of roads and communications or for want of proper upkeep and repair of such roads (as for example in the case of Palè-Mintaing-bin road which is impassable by carts during the rains owing to its muddy and slushy state) the agriculturists living in villages and hamlets, so adjacent to the big towns as to be within twenty or twenty-five miles of the same, are deprived of the facility and quick means of transporting their agricultural produce to the big towns and are therefore compelled to dispose of the same locally at inordinately lower prices.

(*v*) & (*vi*) For want of posts and telegraphs in the outlying small villages the mails or telegrams have to be sent on from the villages having post and telegraph offices. When the *dâk*-runners cannot personally come over to the village of destination they are wont to pass on the mails through a casual traveller and therefore the mails and telegrams are sometimes either lost in this way or, if delivered, only after excessive delay,

QUESTION 5.—FINANCE.—(*a*) In recovering the agricultural loans and advances at present issued by the Government of Burma for purchase of seed-grains and cattle or for improvement of agricultural lands, it is advisable that a further concession should be given to the agriculturists to repay the same in instalments in four years. There should also be a reduction in the rates of interest charged.

With regard to the issue of the loans and advances referred to above, as the agriculturists are apt to apply the same for use in other ways than those intended, it ought not to be given out in cash, but in the shape of the required seed-grains and cattle, and the necessary documents made and executed merely for the amount of their values.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—(*a*) (*i*) The high cost of cloth and material, food and the necessities of life; the incidence of the rainfall; holding-off of rain when wanted by the agriculturists and unseasonable downpour when not wanted, resulting in the wastage of two or three supplies of seed-grains, for failure to sow the same at the proper time, and in poor outturn; the want of regularity in the rainfall which should enable the agriculturists to raise the seasonal crops; and want of exercise of habits of economy and frugality on the part of the agriculturists commensurate with, and with due regard to, their income. It would indeed not be far wrong to say that there is an entire absence of knowledge and exercise of such habits.

(*ii*) Such of the agriculturists as are members of co-operative credit societies take loans from the societies on interest at the rate of Rs. 1-4-0 per cent per mensem, and besides this, some of the members of such societies yet take loans from moneylenders of their own localities at an interest of Rs. 2-8-0 per cent per mensem on security. In the case of agriculturists who are not members of co-operative credit societies, they take loans from the local moneylenders at an interest of Rs. 2-8-0 per cent on security and at an interest of from Rs. 3 to Rs. 5 per cent without security. Those agriculturists who are close to the *chetties* would take their loans from them on some form of security or other. Some agriculturists take loans of money, not as mere loans of money but as a kind of advance payment for a particular kind of crop or grain, to be repaid in kind at the harvest. For example, if from forecast and foresight it is thought that groundnut would be selling at Rs. 125 at harvest, it is a common practice to take loans of money in advance and against the harvest for supply of a hundred baskets of groundnut at the rate of Rs. 80. The same method prevails with regard to other kinds of crops and grains.

Of all the methods of taking loans, the co-operative method is the cheapest.

(*iii*) Inability to repay loans is due to the fact that, instead of utilising such loans for the object or purpose intended at the time the loan was taken, the money is employed on other and unprofitable objects.

(*b*) The extreme indebtedness of the agriculturists which prevents them from repaying their debts is in a way due to the exorbitantly or unduly high rates of interest charged, and therefore it is advisable to enforce the application of the Usurious Loans Act.

(*c*) A restriction ought to be put upon the agriculturists' unlimited right of mortgaging or selling their lands.

Further untold harm is done to the lands and *yas* by non-terminable mortgages; however, it is not yet opportune to prohibit this; any such measures ought, if at all, to be taken only after the Government has opened land mortgage banks.

QUESTION 7.—FRAGMENTATION OF HOLDINGS.—(*a*) That the fragmentation of holdings has adversely affected agricultural efficiency is beyond any manner of doubt. This is due to the fact that, being *bobabaing* lands, the lands are partitioned off and distributed either at a division of inheritance or at the time of making gifts to the children, and also owing to the existence of the right of mortgage and sale.

(*b*) In case of State lands, as they are not subject to any such right of mortgage, sale or partitioning, they are not liable to be so split up. It is therefore advisable that the Local Government should resume all the *bobabaing* lands in occupation, and all such of the resumed lands as

are of similar area, value, class and kind and are contiguous to one another should be re-allotted, and a strict restriction placed upon mortgage, sale and partition.

(*c*) The distribution or allotment of lands should be decided by appointing local elders as *thamadis*, *i.e.*, umpires or arbitrators.

QUESTION 8.—IRRIGATION.—(*a*) (*ii*) It is advisable that the Government should construct tanks in suitable places in Lower Chindwin district and that a suitable or reasonable water tax be levied on the lands irrigated by such tanks.

QUESTION 9.—SOILS.—(*a*) (*i*) Owing to the ruined state of the old tanks and weirs of importance in Lower Chindwin district at the present time, the *ya* lands and paddy lands have been ruined owing to inundation caused by the creeks and streams springing up there. Therefore the said old tanks and canals ought to be reclaimed and repaired.

(*c*) It is advisable that arable jungle land that can be cultivated but is left uncultivated should be brought under cultivation, formed into *yas* by the Government and sold to those who are willing to cultivate it, the price being recovered from them by allowing them to pay it off in small easy instalments out of the money earned by them as a result of their industry.

QUESTION 10.—FERTILISERS.—(*f*) It is advisable that the use of cowdung as fuel should be prohibited by law.

QUESTIONS 11.—CROPS, 12.—CULTIVATION, 13.—CROP PROTECTION, INTERNAL AND EXTERNAL, AND 14.—IMPLEMENTS.—For the success and attainment of the objects contained in these we look to the Agricultural Department. The advice and suggestions given by the said department have always been followed.

QUESTION 15.—VETERINARY.—(*c*) (*i*) The agriculturists freely make use of the veterinary dispensaries.

(*d*) Strict legislation by the Government is called for, providing for inoculation, and prevention of movement of sick and diseased cattle from one village to another, and forbidding the sale and consumption of carcases of such cattle on the outbreak of an epidemic of infectious or contagious disease.

(*e*) The supply of sera is sometimes insufficient.

(*f*) No fee is charged for inoculation.

QUESTION 16.—ANIMAL HUSBANDRY.—(*a*) (*i*), (*ii*) & (*iii*) The Agricultural and Veterinary Departments are looked up to for animal husbandry.

(*b*) (*i*) There are no such things as grazing grounds or pasture lands in Chindwin district. Moreover, an individual agriculturist can afford to keep only about four head of cattle, whereas the non-agriculturist Indians keep several head of cattle, sheep and goats and consequently even a grazing ground for cattle is non-existent. In addition to the above, owing to the presence of these cattle belonging to the Indians, the stalks of millet and other fodder for cattle have gone up in price out of all proportion and consequently the indigenous agriculturists are hard put to it for want of fodder for their cattle.

(*c*) The scarcity of fodder for cattle in the months of *Tabaung*, *Tagu*, *Kasôn* and *Nayone* (March to June) is very much felt.

The cattle begin to put on flesh only after a lapse of about three months after the end of the period of scarcity.

QUESTION 17.—AGRICULTURAL INDUSTRIES.—(*a*) An average agriculturist would be engaged in his work intermittently for about 160 days in the year.

During the slack season he generally engages himself either in carting work or in selling his crops.

(*b*) Cattle-breeding is suitable.

(*c*) Poultry-rearing, fruit-growing, etc., may be profitable if carried on in suitable localities.

(*e*) Transfer of big mills to rural areas, although it may provide the agriculturists with work and employment, is not looked upon with favour.

(*g*) The opening of handicraft or industrial institutions is desirable.

QUESTION 19.—FORESTS.—(*b*) If the reservation of forest compartments ceased, there would be a plentiful supply of firewood for fuel.

QUESTION 20.—MARKETING.—(*b*) With regard to the intermediary stages that a commodity will pass through in the course of the sale and purchase transaction, as between the producer and the consumer, until it finally reaches its destination in some foreign market, the following illustration as an instance in point will suffice:—

For example, the jungle or district brokers buy a hundred baskets of paddy from the agriculturists at the rate of Rs. 100 and then sell the same at Rs. 125 to the town brokers who, in turn, sell the same to the merchants at the rate of Rs. 150, when the latter again sell it to the big mill-owners at the rate of Rs. 175. In this way, while the agriculturists themselves could only get Rs. 100 for their hundred baskets of paddy, the price of paddy would go up to a figure of Rs. 175, thus causing a loss of Rs. 75 to the agriculturists on every hundred baskets of their paddy; this calls for some measure of relief to be brought about by the Local Government.

(*d*) If Government would come to the assistance of the agriculturists by devising ways and means for keeping the agriculturists well informed as to the prevailing foreign market price of the commodities concerned, the agriculturists would then be safe from the possibility of being unfairly treated by the brokers and merchants.

QUESTION 22.—CO-OPERATION.—(*a*) *&* (*b*) It is the duty of the Government to encourage co-operative societies.

(*c*) Where such schemes exist, those who do not join should be compelled to join by means of legislation.

(*d*) With regard to the societies that have attained success in the objects aimed at, the Payitkon Central Co-operative Society, Limited, for the collection, sale and purchase of seed grain, Mônywa Township, Lower Chindwin district, the affairs of which I personally am carrying on as its chairman for the present, may be mentioned as one whose objects are—

To prevent admixture of the grains and crops forming the usual items of cultivation by the agriculturists, to provide facilities for getting good, pure seed-grains at cheap prices, and for the spread and propagation of good, pure seed-grains, etc.

QUESTION 23.—GENERAL EDUCATION.—(*a*) (*iii*) From the nature and circumstances of their avocations, it is not possible for the agriculturists to keep their children at school at all times continuously; the more immediately urgent needs at home have to be attended to, such as employing them for tending cattle, etc., resulting in a small percentage of passes. This being so, it is advisable that the Government should open schools for imparting instruction in handicrafts in rural areas.

QUESTION 25.—WELFARE OF RURAL POPULATION.—(*b*) It is particularly desired that the Government should make enquiries as to the state and condition of the agriculturists, with special reference to their income and expenditure and their mode of living.

U YIN GYI, U LU HMAW and THUGYI U BA TIN, Representative Agriculturists from Upper Burma.

Oral Evidence (through an interpreter).

64828. *Sir Thomas Middleton* (*Chairman*): U Yin Gyi, and U Lu Hmaw, I understand that you gentlemen are here as representatives of the agriculturists of Upper Burma?—Yes.

64829. Do both of you cultivate land yourselves?—Yes; both of us are cultivators.

64830. U Yin Gyi, how much do you cultivate?—(*U Yin Gyi*) I cultivate about sixty acres of land with five pairs of bullocks.

64831. What are the crops you grow on these sixty acres?—The chief crop is cotton (*wagyi*); the other crops are sesamum, beans and *juari*.

64832. U Lu Hmaw, how much land do you cultivate?—(*U Lu Hmaw*) About forty acres.

64833. What are the chief crops?—I have various kinds of soils and I cultivate a variety of crops, such as cotton, *juari*, beans, gram, and onions.

64834. Has there been established, in your district, a co-operative society for the sale and purchase of seeds?—Yes.

64835. For how many years has that society been operating?—About three years.

64836. How much seed did they sell this year?—The society has bought seed worth about Rs. 13,000 for distribution.

64837. Do they purchase anything else besides seed? Do they purchase implements?—They also buy ploughs from the Agricultural Department and distribute them.

64838. Both of you have told us, in your answers to the Questionnaire, that the Agricultural Department has done good work in your districts. U Lu Hmaw, you have mentioned the very successful propagation of good and pure seed of Karachi gram; U Yin Gyi, you have mentioned five different ways in which the department has assisted the cultivators in your district. Another agriculturist whose evidence is now before us answers Question 3 (*d*) in this way: "No measures have been taken by the department which have in my view been successful in improving the agriculture of the district." That gentleman does not agree with the statement you have made. Have you anything to say on that? Are you surprised at this statement?—We are surprised to hear it.

64839. You yourselves recognise what the department has done; you are convinced that it has been successful, and you have given us proofs. Have you heard, among your neighbours or among your friends, statements to the effect that no good result has followed?—We have never heard any such criticism; only very few criticise the work of the department.

(*At this stage Thugyi U Ba Tin joined the other two witnesses.*)

64840. This college in which we are met was built for the agriculturists of Burma. Why do so few students from among the agriculturists of Upper Burma attend it?—(*Thugyi U Ba Tin*) The cultivators do not yet know the value of agricultural education.

64841. Do you recognise its value?—We do recognise its value.

64842. U Lu Hmaw, you have told us that the Veterinary Department is assisting you in your district. In what way have you found the Veterinary Department helpful to you?—They effect the cure of animals in case of illness; they also segregate the animals in order to prevent the spread of contagious diseases.

64843. Have you got a veterinary dispensary in your district?—There are Veterinary Assistants, but I am not aware of the existence of any veterinary dispensary.

64844. Where does the Veterinary Assistant keep his medicines?—He keeps the medicines in his own residence.

64845. Does the Veterinary Assistant tour about in the district, or does he live in one village and get agriculturists to bring sick animals to him?—In case of any illness among cattle, a report has to be made to the *thugyi*, and the *thugyi* calls in the Veterinary Assistant.

64846. In answer to Question 6, U Lu Hmaw, you have told us something about co-operative credit societies, and you say "Of all methods of taking loans the co-operative method is the cheapest." In your opinion, why is it that the co-operative movement is making slow progress in this part of the country?—The reason is that the loans granted to the members are not utilised for the purpose for which they are granted. For instance, if a loan is granted for buying bullocks, the money is usually spent in buying other things, such as clothes, etc.

64847. Do not the societies exercise any supervision over the members to whom loans are granted?—The society does supervise the spending of the loans, but the committee usually comes to know about the position when things have gone too far.

64848. You are of opinion that the non-terminable mortgage does a great deal of harm in Burma?—They take more and more loans on the mortgage of the land.

64849. You think they do great harm, but you also think it would be a mistake to try, by legislation, to prevent such mortgages being granted. What is your reason for thinking that there should be no effort to interfere with the granting of non-terminable mortgages? Is it your opinion that we ought to wait until there is a land mortgage bank? If these mortgages were interfered with do you think that the agriculturists would go without credit of any kind?—I do think so.

64850. How many pairs of oxen have you got?—Two pairs.

64851. Do any of you in your district breed your own cattle, or do you purchase your plough-cattle?—Sometimes we breed them and sometimes we buy.

64852. What is the common practice?—Mostly, plough-cattle have to be bought.

64853. We heard complaints in Lower Burma that plough-cattle had become very dear in the last few years. Have you found a great increase in price in the last few years?—The price has increased very much.

64854. I want to know what the price was ten years ago and what it is now?—Ten years ago a pair of bullocks would cost Rs. 200; at present they cost from Rs. 300 to Rs. 350.

64855. That is a much higher price than we heard quoted in Lower Burma?—That is the price we actually pay now here.

64856. *Sir James MacKenna:* U Lu Hmaw, you are the Chairman of the Payitkon Union?—Yes.

64857. Do the members pay back the loans they get from the society?—They usually pay back; only a few are defaulters.

64858. Do you think it is possible to make a living out of agriculture?—We cannot.

64859. Do you have a seed purchase and sale society?—Yes. We have one.

64860. Which is better, the seed purchase and sale society, or the co-operative credit society?—In my opinion the seed purchase and sale society is better.

64861. I should like to ask each one of you what benefits you have derived from the Agricultural Department?—(*U Ba Tin*) I have had the advantage of getting purer seed from the Agricultural Department. I have got varieties of paddy which thrive very much better now in Kyaukse where I have got land. (*U Lu Hmaw*) I have had the advantage of obtaining better varieties of gram such as the Karachi gram; I have also had a better variety of cotton called Cambodia in place of the indigenous variety. (*U Yin Gyi*) I derived the advantage of obtaining purer and selected varieties of cotton. I am living in the cotton tract. I have got seed which has a good germinating capacity.

64862. So, all of you think that the department has been of some use to you?—We think so.

64863. All three of you gentlemen do not grow departmental seed, do you?—We, U Lu Hmaw and U Ba Tin, grow departmental paddy.

64864. Do you get a premium price for the paddy that you grow?—Yes, we do.

64865. How much do you get?—About ten rupees per hundred baskets of paddy.

64866. There are various standards of baskets in Upper Burma; is that not so?—Yes.

64867. Would you like to see a uniform basket introduced?—That would be a most desirable thing.

64868. I think one of you gentlemen has said that you grow Karachi gram?—Yes, only one of us grows Karachi gram.

64869. How many acres of Karachi gram have you got?—(*U Lu Hmaw*) About five acres.

64870. Do you sell your produce of Karachi gram, or do you keep it for your own consumption?—I keep a little for seed and a little for consumption; the rest I sell.

64871. With regard to ploughs, may I know what ploughs all of you use?—We are just beginning to use *Theikpan* ploughs this year. We have obtained the ploughs from the department.

64872. Is it a better form of plough than you used before?—The work that can be performed by a Burmese plough in three days can be performed by the *Theikpan* plough in two days.

64873. *Mr. Kamat:* U Lu Hmaw, you have stated in reply to Question 4, as follows: "Another unsatisfactory feature is the enhanced rates in the schedule of freight charges on goods. A reversion to the normal state of affairs with regard to those charges cannot be too strongly urged. The best plan would be for the Government to take over the management of the said railways and steamer services." When were those rates enhanced?—They were enhanced after the War.

64874. When you refer to reversion to the normal state of affairs, do you mean before the War here?—I was referring to the normal rates before the European War.

64875. Are the railway freight expenses the same as they were before the War?—I do not know.

64876. Are the prices which you are getting for rice and other produce the same as they were before the War?—In the case of *pebyngale* (Rangoon white beans) I got a better price before the War.

64877. You are prepared for a better price, but you are not prepared to pay the enhanced rate which the railways charge owing to their having to incur enhanced expenditure. You make a suggestion about tanks and weirs and the question of their repair. Are there many such tanks in the tract you refer to?—There are quite a number of them in Payitkon village tract in the Lower Chindwin district.

64878. Have you drawn the attention of the Government officers concerned to the state of these tanks?—No.

64879. With regard to uncultivated lands, you suggest that these should be brought under cultivation and formed into *yas* by the Government and sold to people who are willing to cultivate them. Can you specify where waste uncultivated lands are situated for which there is a demand?—There are such lands in the Budalin township in the northern part of the Lower Chindwin district.

64880. You think that people would be willing to take up these lands on the conditions you suggest?—I think that there are people who would be willing to take up the land under the conditions specified by me, if payment of the price of the land could be made in instalments.

64881. We are told that much of the waste land is of such poor quality that little profit would accrue from cultivating it. Do you think that the land you are referring to could be worked at a profit?—I think so, as regards the land in my own district.

64882. You make the suggestion that, in recovering agricultural loans issued by the Government of Burma for the purchase of seed-grains and cattle, these loans should be repayable by instalments spread over four years. What is the present system?—The loan must be paid up in full in two years.

64883. *U Ba Cho:* You said that the price of a pair of bullocks in your part of the country is from Rs. 300 to Rs. 350. This is the price that you have actually to pay for your bullocks?—Yes, there is a vast difference between the bullocks that we use in our locality which cost us anything from Rs. 300 to Rs. 350 and the bullocks sent down to Lower Burma. We send down only inferior bullocks. A pair of bullocks which costs Rs. 150 in Lower Burma will be worth only Rs. 110 in Upper Burma.

64884. *Mr. Calvert:* U Lu Hmaw, could you tell me the number of members in your society?—(*U Lu Hmaw*) About 400.

64885. Are they tenants or owners, or both?—Some are owners of land; others are share tenants.

64886. From what area are they drawn; from one village, one township or a group of villages?—From an area of about two square miles.

64887. What is the liability?—The liability is limited.

64888. To what amount?—If they purchase a five-rupee share, they are liable up to twenty-five rupees.

U Yin Gyi, U Lu Hmaw and Thugyi U Ba Tin]

64889. Is seed given to members on credit or for cash?—On credit.

64890. Do you know that, under the new law, your society will now be an unlimited liability society?—I have not seen the Act; I do not know.

64891. If the liability is to be unlimited, will it do good or harm to the society?—It will do harm to the society.

64892. From what source do you buy the seed?—We buy the seed locally; if seed is not obtainable locally, then we buy from the Agricultural Department.

64893. By 'locally' do you mean from local cultivators or shop-keepers?—From selected cultivators, not shop-keepers.

64894. When you buy seed do you buy it on credit or for cash?—For cash.

64895. From what source do you get the money with which to buy the seed?—We get it from the share capital, and if that is insufficient, we borrow from the Provincial Bank.

64896. What is the difference between the price which you pay for the seed and the price at which you sell it?—This year we made a loss on one transaction; we bought paddy at Rs. 255 and sold it at Rs. 250.

64897. Was that an accident or a miscalculation?—The seed had to be sold at the price prevailing at the time of selling.

64898. On what system do you buy your seed? Do you collect indents from all the 400 members, consolidate the indents and then buy; or do you merely guess the requirements?—We get applications from the members, and we make a guess on the basis of the quantity applied for. If the members apply for 1,000 baskets, we buy a little extra, say, 1,200 baskets.

64899. You get applications from all members; you collect them together and then add up the amounts and afterwards buy the seed?—We add up the indents and then buy the seed.

64900. How many different kinds of seeds do you deal in; paddy is one; do you deal in other grains?—Yes; gram, *juari*, red beans, wheat, and *mungoo* beans.

64901. You mentioned that some of your tenants were sharing tenants; what share do they pay?—If the land is good land, the owner takes half; in other cases, the tenant gets three-fifths and the owner two-fifths.

64902. If a cultivator can afford to pay a rent of half the produce, why cannot the small owner pay half his produce towards his debts?—If the season is good and the harvest a success, the land-owning cultivator can pay half the produce towards his debts.

64903. We have been told to-day that he does not pay back the society's debts?—I am not in a position to answer that question.

64904. Do you gentlemen know, personally, of cases where cultivators' cattle have been attached and sold in execution of a decree in a civil court?—If the cultivator has more than a yoke of oxen and a bullock cart, the excess can be attached by the civil court. But we have not come across any such case.

64905. *Dr. Hyder:* How many baskets of rice did you gentlemen get last year as your share of rents or as the reward of your own labour?—(*U Yin Gyi*) I have no land under paddy cultivation. (*U Lu Hmaw*) I got 200 baskets of paddy last year. (*U Ba Tin*) I got 800 baskets last year.

64906. Of the total quantity of rice, how much did you give away in charity during the last twelve months? And how much did you gentlemen give away in a similar manner?—(*U Lu Hmaw*) I spent sixty to seventy rupees in charity last year.

64907. How many baskets of rice did you give away?—I do not cultivate paddy in a large scale. I sell peas and beans, and I spend in charity from the money obtained thereby. (*U Ba Tin*) I gave away 150 baskets of rice in charity.

64908. Do any of you gentlemen know what wireless is?—We do not know what it is.

64909. Would you like to have a cinema in your villages?—If there is anything novel, people will like it at first.

64910. Do you have to pay *bakshish* to the Veterinary Assistant? Government makes no charge, but does the Veterinary Assistant charge you anything?—No.

64911. *The Chairman (Sir Thomas Middleton):* Do the crops in any of the districts from which you come suffer much from cattle trespass?—There are many cases of cattle trespass.

64912. U Lu Hmaw, could you give us an estimate of the damage which you yourself suffered last year from this cause?—That depends upon the number of bullocks trespassing. If a bullock trespasses into a paddy field, damage to the extent of a quarter of a basket is caused; if it trespasses into a bean field, one-eighth of a basket is the damage.

64913. Could you give us some idea of the amount of loss which you suffer from the trespass of cattle?—From fifteen to twenty rupees. (*U Ba Tin*) About forty rupees.

64914. On how many acres of land did that loss occur?—(*U Ba Tin*) On six acres of *jowar*.

64915. What is the total area of your holding?—A little over forty acres.

64916. Is there any other point which any of you wish to bring before the Commission?—(*U Ba Tin*) In my district there is a dam for irrigation. It has been washed away by the heavy rains last year, and I shall be glad if Government will go to the expense of restoring the dam.

64917. *Dr. Hyder:* Do the Chinese shopkeepers in your villages teach the cultivator bad habits like the smoking of opium or the drinking of liquor?—Chinese shops exist only in some villages, and if there are Chinamen in the village opium is usually smuggled in.

64918. Does the Chinaman keep the opium for his own use, or does he introduce it among the cultivators?—The cultivators also are contracting the habit of opium-smoking.

64919. On account of the Chinamen?—Yes. (*U Yin Gyi*) There is one point which I should like to bring to the notice of the Commission. I want some of the cultivators in my area to get the privilege of grazing cattle in forest reserves and also of extracting some wood for making cultivation implements.

64920. Is there anything else that you want to bring before the Commission?—I want land mortgage banks to be established in Burma so that the cultivators may get loans at cheap rates of interest, in order that they may make a living out of their holdings.

(The witnesses withdrew.)

The Commission then adjourned till 2-30 *p.m. on Monday, the* 21*st November*, 1927, *at Patna.*

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Distribution of activities, fair as between demonstration and research (*McKerral*) (16) 60914-5; sufficient attention given to Lower Burma wet area and dry area of the mid-zone, but not much to Northern area (17) 60923-7; not much assistance given to planters (22) 61004-9.

District farms for experiment (*McKerral*) (16) 60906.

Education, agricultural, should be left to Department (*Pan, etc.*) (191).

Engineers, agricultural, to be added to cadre of Superior Provincial Service (*McKerral*) (30) 61143-6; to improve implements (30) 61148. (*See under* **IMPLEMENTS.**)

Engineering, agricultural, need for development (*Jevons*) (266), (274) 63899-901.

Forestry Department does not come much into touch with (*McKerral*) (28) 61114-15.

Indebtedness, not immediately concerned with (*McKerral*) (46) 61398-402.

Legislative Council, friendly attitude of (*McKerral*) (42) 61339-40, (55) 61543-7.

Myingyan Circle: interest taken by cultivators; farmers' associations organised (*Robertson*) (348-9) 64474-8.

Peripatetic demonstrators, two senior agricultural assistants for each district (*McKerral*) (16) 60908-9.

Personnel (*McKerral*) (16) 60905.

Seeds, paddy, supplied by Agricultural Department, premium of Rs. 10 per 100 baskets paid (*Gyi, etc.*) (401) 64863-5.

AGRICULTURAL DEPARTMENT—*contd.*

Sericultural Section, four senior assistants and four fieldmen (*McKerral*) (16) 60905.

Service: satisfactory (*Pan, etc.*) (191); (*Maung, etc.*) (171); unsatisfactory (*Shwe, etc.*) (380).

Service: has brought immense benefits to agriculturists (*Gyi, etc.*) (395-6), (400) 64838-9, (401) 64861-2; owing to lack of communications, nothing done for cultivators; conditions the same as 50 years ago (*Tun, etc.*) (206), (209-11) 63176-87. (*See under* **CROPS AND CROP PROTECTION.**)

———, Remarkably good work in the circumstances (*Jevons*) (266). Work, considerable; should be strengthened (*Dan*) (240) 63575-9.

STAFF:

Insufficient in subordinate grades; increased pay necessary (*McKerral*) (5); (22) 60999-61000; insufficient correlation with other departments (5); short term appointments inadvisable (21) 60990-1; promotion from subordinate service (30)61151-3, (42)61328; training abroad (42) 61328-30; vacancies to be filled by short term agreements (42) 61337-8; method of recruitment in England (43) 61346-8.

Inadequate (*Dun*) (372); should be 5 times as large; European and trained Burman officers required (*Jevons*) (266), (274) 63902; more junior officers required for village work (*Tun, etc.*) (210-1) 63184-7; for research adequate (*Pan, etc.*) (190); junior Officers should be recruited from cultivating classes (205) 63164-6; trained labourer cultivators should be permanently appointed for demonstration (*Robertson*) (340); in Myingyan Circle (348) 64459-62.

Superior Provincial Agricultural Service, no announcement as to (*McKerral*) (23) 61017-8; rules being framed (*Dunn*) (78) 61751-7.

Tenasserim: planting problems mainly, department not in touch with quinine growing (*McKerral*) (22-3) 61010-4.

Yamethin Township; farm benefits only the immediate neighbourhood (*Tun, etc.*) (209) 63176.

AGRICULTURAL INDEBTEDNESS,

Agricultural Department not immediately concerned with (*McKerral*) (46) 61398-402; should administer Government loans (*Gyi, etc.*) (396).

Ancestral indebtedness not serious (*Dunn*) (81) 61784; considerable (*Maung, etc.*) (182) 62887-9.

Attachment of cultivators' cattle for debt (*Gyi, etc.*) (403) 64904.

Bhamado: interest, charged by middlemen (*Dunn*) (93) 61877.

Buddhist religious desire to repay loans (*Pan, etc.*) (196), (200) 63061.

Causes of borrowing: (*Dunn*) (67); rinderpest (*Dawson*) (255), (257) 63703; thriftlessness, festivals, sickness, litigation (255), (259) 63731-2; want of banking facilities, high standard of living (255), (261) 63781-5; high cost of living and floods (*Pan, etc.*) (191); lack of means, crop failures, human and animal disease, high interest, thriftlessness and gambling (196); poor results of cultivation owing to irregular rains (*Gyi, etc.*) (395); high cost of living, irregularity of rainfall, lack of economy (397); improved standard of living and higher rate of interest (*Tin*) (104); crop failure, high prices, high wages and absconding labourers (*Maung, etc.*) (171), payment of rent in advance (173); poverty, loss of cattle, high price of cattle owing to slaughter by licensees, crop failures owing to drought and flood, fisheries, lack of irrigation (*Tun, etc.*) (206); not litigation, which is caused by indebtedness (223) 63367-70; need of expenditure before harvest, facile credit, improvidence, crop failure and loss of cattle (*Dan*) (237); lack of capital and having to rent land, failure to prepare estimates of future expenses and profits (*Shwe, etc.*) (380); recklessness and extravagance (387); irregularity of rainfall, insect pests, cattle disease, smallness of income (391); increased cost of living owing to introduction of civilised luxuries (*Sein*) (351); decreased incomes of cultivators, increased cost of land and labour (352). Net return on capital invested in agriculture 9 per cent; yet cultivators borrow from chetties at 24 per cent (358) 64556-63; rise in value of land has increased credit and so led to increased borrowing (359) 64584-9.

Chettyars: press for repayment when paddy prices low (*Pan, etc.*) (198); interest 18 to 36 per cent; insist upon valuable security; not elastic (*Tin*) (104).

Civil Procedure Code, provisions for protection of cultivators from harassment by cultivators, a dead letter (*Dunn*) (67); ignored by Courts (81) 61785-8.

Competition among chetties prevents enslavement of borrowers (*Dunn*) (91) 61864, (93) 61875.

AGRICULTURAL INDEBTEDNESS—*contd.*

Control of cultivators' credit by limiting mortgage and sale advocated (*Pan, etc.*) (191); (*Maung, etc.*) (171); not advocated (*Pan, etc.*) (196).

Cotton: loans on growing crops (*Edwards & Nelson*) (225-6).

Debt: Ancestral, considerable (*Maung, etc.*) (182) 62887-9; not serious (*Dunn*) (81) 61784.

— —Extent of: eighty per cent of people seriously indebted and many have become landless tenants; position has become much worse in the last 10 years (*Sein*) (358) 64565-70.

— —Greatest in richest parts (*Dunn*) (90-1) 61863-6.

— —Increasing with value of land; cultivators not ashamed of being in debt (*Maung, etc.*) (182) 62887-93, (188) 62992-5.

Important factor in relation to agricultural progress (*McKerral*) (23) 61025-7.

Imprisonment for debt should be abolished (*Dunn*) (87) 61827-31.

Attachment of plough cattle for debt, common (*Pan, etc.*) (204) 63153-4.

Insolvency: court relief would make indebtedness worse (*Pan, etc.*) (196).

Interest: heavy on subsistence and cultivating loans (*Dun*) (373-5); rates of chetties decreasing (*Dunn*) (73-4) 61726; but middlemen increase the rates of interest (93) 61877.

Labourers, field, suffer by having to sell their paddy before harvest at a low price (*Dan*) (238); have to sacrifice half the price; are hired during the rains for baskets of paddy to be delivered at harvest; would benefit if they could borrow money at reasonable interest (239) 63554-60.

Land mortgage banks charging low interest should be started by Government (*Gyi, etc.*) (396), (*Tun, etc.*) (207).

Legislation: to protect cultivators from usury should be enforced after provision has been made for Government loans (*Dun*) (375); to restrict or control credit of cultivators inadvisable (*Dunn*) (67).

Limitation of accumulated interest to an amount equal to principal (93) 61878-80.

Measures to lighten agriculture's burden of debt: Improvement in production and marketing, joint purchase, reduced rate of interest, thrift, Usurious Loans Act, redemption of mortgages (*Tin*) (105); fixing interest and wages, and binding labourers so as to prevent loss to cultivators (*Maung, etc.*) (171); legislation prohibiting excessive interest, of which public must be informed; non-liability to attachment for debt of implements, etc. (174); protection against flood, long term loans, low interest (*Pan, etc.*) (191); Insolvency Court will make indebtedness worse (196); Usurious Loans Act, rigid enforcement of, land mortgage banks, extension of Government loans, co-operative societies (*Tun, etc.*) (207); better repayment would lower interest (*Dawson*) (255).

Moneylenders: Co-operators borrow from, at 36 and 60 per cent after crop failures (*Sein*) (357-8) 64552-5; do not regard co-operative movement as a serious competitor (360) 64601-2; live in luxury by exploiting cultivators (367) 64703-6; high rate of interest: 36 to 60 per cent in cash and 100 per cent in kind; personal contact and elasticity (*Tin*) (104); not driven away by co-operation (*Maung, etc.*) (182) 62894-7, (186) 62954-63; not wicked (*Dunn*) (93) 61876.

Mortgages: non-terminable, should be prohibited after Government has established land mortgage banks (*Gyi, etc.*) (397), (400-1) 64848-9; redemption should be facilitated, and should be cancelled by payment of principal and of interest equal to principal (*Shwe, etc.*) (380).

Productive and unproductive borrowing, difficulty of defining (*Dunn*) (70-1) 61685-6.

Reasons preventing repayment (*Dunn*) (67), (71) 61689-92; (*Tin*) (105); people live beyond their incomes (114) 62192-7; high interest and expenses of paddy land (*Maung, etc.*) (171), (173); crop failure due to floods, and high interest (*Pan, etc.*) (191); human and animal disease, thriftlessness and gambling (196); poverty, high interest, early sale of crops to pay land revenue in March, crop failure owing to drought and flood (*Tun, etc.*) (207); same factors as cause borrowing (*Dawson*) (255), (*Dan*) (237); high interest which exceeds return on capital invested in agriculture (*Sein*) (351-2), (358) 64556, (363) 64653-4 (see *under* Standard of living *under* **WELFARE OF RURAL POPULATION**); excess of expenditure over income (*Shwe, etc.*) (391), poor yield and low prices (396); unprofitable use of loans and exorbitant interest (*Gyi, etc.*) (397).

Restriction of credit of cultivators, not advocated (*Tin*) (105). (*Dawson*) (255), (*Gyi, etc.*) (396) advocated (*Shwe, etc.*) (380); Usurious Loans Act should be enforced and non-terminable mortgages should be prohibited after Government has established land mortgage banks (*Gyi, etc.*) (397), (400) 64848-9.

AGRICULTURAL INDEBTEDNESS—*concld.*

Sources of Credit: Village moneylender, *chetty*, co-operative society, local wealthy persons, Government banks, jungle traders, brokers (*Maung, etc.*) (171), (173); (*Pan, etc.*) (191), (196); (*Dawson*) (255); (*Tin*) (104); (*Tun, etc.*) (206); (*Gyi, etc.*) (395), (397); (*Dunn*) (67); landowners and wealthy villagers for those who have a little security to offer, *chetties* and Chinamen for those who have adequate security; co-operative loans are insufficient and have to be supplemented by other sources of credit (*Shwe, etc.*) (380), (391).

Thrift: is practised by cultivators (*Sein*) (367) 64703-6; advantages of, not appreciated (*McKerral*) (13), (53) 61504-10.

Usurious Loans Act: should be rigidly enforced (*Tin*) (105); provisions should be brought to the notice of Judges (114) 62198-200; should be applied with discrimination (*Pan, etc.*) (196); essential to enforce with more rigidity and more extensively (*Tun, etc.*) (207); should be enforced (*Gyi, etc.*) (397).

AGRICULTURAL INDUSTRIES.

Bags and packing manufacture may be established with Government aid (*Pan, etc.*) (198).

Basket-making: practise all over Insein District (*Pan, etc.*) (193); may be established with Government aid; obstacle is lack of knowledge (*Pan, etc.*) (198); most people can only do if paid a daily wage (*Dan*) (238).

Bee-keeping: almost unknown (*Dan*) (238); religious objection (*Pan, etc.*) (193), (198); (*McKerral*) (11); Research necessary (*Ghosh*) (298); should be central as a separate department with a specialist; local bee not suitable; Italian bee should be introduced (299); no religious objection (330-1) 64208-11, (336) 64331-3; easy and profitable (332) 64241-9.

Buddhist religious objection to taking life: in many places not strict (*Ghosh*) (300); no objection to bee-keeping and should be none to lac culture (330-1) 64208-13, (336) 64331-5; sericulture: tradition and economic pressure overcome religious objection (333) 64254-9; people sympathetic to efforts to destroy pests (336) 64316-22.

Buddhist religion, an obstacle (*Dunn*) (68).

Carting: in slack season (*McKerral*) (11); by agricultural labourers in industrialised areas of agriculture not affected by competition of railways and motor cars: (*Dunn*) (88) 61838-41.

Cattle-breeding, a subsidiary industry (*Gyi, etc.*) (398).

Co-operative societies for establishing cottage industries should be introduced among housewives (*Sein*) (352).

Cottage industries dependent upon local supply of material (*Dunn*) (68).

Cotton gimneries employ rural labour (*Dunn*) (68).

Cutch: boiling in slack season (*McKerral*) (11); made in very large quantities (*Hopwood*) (124) 62341.

Employment, rural, can be increased by irrigation enabling more than one crop to be raised per year (*Pan, etc.*) (198).

Factories, establishment of, in rural areas, promising; Government should encourage (*Dunn*) (68).

Fisheries, inland, appointment of special officer (*Dunn*) (74) 61727-31; clash of interests of fishermen and agriculturists (104) 62004.

Forests: labour employed is agriculturist (*Hopwood*) (120) 62266-9; mainly local but some immigrant, 150 forest villages (121-2) 62300-8; large number of industries (124) 62339-41.

Fruit-growing: Canning: nothing done by Government (*McKerral*) (52-3) 61503.
———— May be profitable in suitable localities (*Gyi, etc.*) (398); hampered by theft and low prices (*McKerral*) (11).
———— Scarcity of land an obstacle (*Pan, etc.*) (193); difficulty of transport and pests (198).

Fuel cutting in slack season (*McKerral*) (11).

Ghi: making in Sagaing District, probably originated by Indians (*McKerral*) (10).
——vegetable, or margarine, not used in Burma (*McKerral*) (52) 61502.

Government: could not do more than private enterprise has done (*McKerral*) (11); better without Government aid (52-3) 61498-503; can do little (*Dunn*) (68).

Handicraft or industrial institutions advocated (*Gyi, etc.*) (399).

Health conditions of villages: district health officers under district council (*Dunn*) (68); education and propaganda by vernacular pamphlets and travelling cinemas in the slack season to induce people to devote spare time to improving their health conditions (*Tun, etc.*) (208).

AGRICULTURAL INDUSTRIES—*contd.*

Industrial concerns: establishment of, in rural areas should be encouraged (*Shwe, etc.*) (384); are set up in rural areas (*McKerral*) (12); intensive study of each rural industry would be useful; industrial inefficiency (12); rural wages affected by (19) 60965-6; would give subsidiary employment to rural population (*Pan, etc.*) (193).

Labourers, field, unemployed for 3 months in the rains and 4 months in hot weather (*Dan*) (238).

Lac culture: limited to particular areas (*Ghosh*) (328), (331) 64212-4; no religious objection (330-1) 64208-13, (336) 64335; made in very large quantities (*Hopwood*) (124) 62341; unprofitable on the plains (*McKerral*) (11); religious objection (*Pan. etc.*) (193), (198).

Leisure period: Cultivation work from May to January; in slack season from January to May carting, collecting firewood, bamboo, thatching and manuring land; 80 days when cultivator has very little work of his own (*Dan*) (238); no connection between slack season and crime (240) 63570-4; 100 days in the year (*Dun*) (376), (378) 64804.

Many fully occupied all the year (*Dunn*) (68), (79) 61766-9; in Insein District, field work 10 months in the year and carting fuel, bamboo, etc., during the remaining 2 months; cultivators have no spare time but labourers may take up subsidiary industries (*Pan, etc.*) (193). On the average, cultivator works about half the year and amuses himself during the other half (197).

May to September cultivating work; October and November collecting grass; December to February cultivating; March and April, little to do, but collecting supplies (*Tun, etc.*) (208).

Varies (*McKerral*) (11); (*Ghosh*) (299).

Work on holding occupies 4 months; in the slack season cultivator does manuring, clearing, etc. (*Shwe, etc.*) (384); none in one district (392); cultivation 160 days intermittently; during slack season carting or selling crops (*Gyi, etc.*) (398).

Mat-making: in slack season (*McKerral*) (11); from bamboo (*Hopwood*) (124) 62342-3; of straw, manufacture may be established with Government aid (*Pan, etc.*) (198).

Mills, transfer to rural areas, not favoured (*Gyi, etc.*) (398).

Obstacles: see **"BURMA VILLAGE ACT"**.

Oil pressing: Cotton seed used for oil extraction or sowing (*McKerral*) (11); mills European and Japanese (33) 61200-2; soap making in Rangoon (52) 61501; Government should help to establish (*Pan, etc.*) (193).

Paper pulp: no manufacture (*Hopwood*) (124) 62344.

Pisciculture, religious objection (*Pan, etc.*) 198).

Poultry rearing: may be profitable in suitable localities (*Gyi, etc.*) (398); Buddhist religious objection (*Dan*) (238), (239) 63549; (*McKerral*) (11); (*Pan, etc.*) (198).

Preparation of agricultural produce for consumption: remarkable progress without Government aid (*Dunn*) (68); should be encouraged by Government (*Shwe, etc.*) (384), (392); (*Pan, etc.*) (193) (198); (*Tun, etc.*) (208).

Public works, roads, irrigation, railways, etc.: co-operative officers should arrange for cultivators to obtain subsidiary employment (*Shwe, etc.*) (389).

Rice: making starch and flour, may be established with Government aid (*Pan, etc.*) (198).

———, Mills employ rural labour (*Dunn*) (68).

———, Straw: paper making and industrial alcohol not tried (*McKerral*) (11).

Rope-making: Cultivators make ropes for their own use (*McKerral*) (11).

————Most people can do only if paid a daily wage (*Dan*) (238).

————Practised all over Insein District (*Pan, etc.*) (193); of Straw may be established with Government aid; obstacle is want of knowledge (198).

————Sawmills in forests (*Hopwood*) (124) 62340.

SERICULTURE: *see under* **GHOSH, C. C.**

Buddhist religious objection (*McKerral*) (11); (*Pan, etc.*) (193), (198).

Certain localities only (*Dan*) (238), (239) 63549-50.

Spinning, may be established with Government aid (*Pan, etc.*) (198).

Standard of life apparently not improved by cottage industries (*Dunn*) (68).

Straw-mats, bags and packing, ropes, boards, pulpware: manufactures may be established with Government aid (*Pan, etc.*) (198).

AGRICULTURAL INDUSTRIES—*concld.*

Study, intensive, of each rural industry, advocated (*Dan*) (238); (*Shwe, etc.*) (384); necessary with a view to introducing improved tools and appliances (*Pan, etc.*) (193), (198).

Sugar: improved furnaces, popular, but demonstration staff insufficient and small area under sugarcane (*Charlton*) (290) 64058-63; Government should help to establish sugar-manufacturing industry (*Pan, etc.*) (193).

Thatching in slack season (*McKerral*) (11).

Weaving, may be established with Government aid (*Pan, etc.*) (198).

AGRICULTURAL LABOUR.

Attraction of, by allotment of cultivable land, advocated (*Pan, etc.*) (193); by labour agents, reduced fares and exemption from capitation taxes (*Tun, etc.*) (208), (221) 63332-42; by co-operative and Government loans and allotment of land (*Shwe, etc.*) (384-5); by taking measures against cholera (392).

Colonisation Department: now Government Estate Department; should consider recruiting colonists from congested areas (*Dunn*) (68).

Recruitment attempted (*Dunn*) (68).

Successful colonies at Minbu and Sittang (*Dunn*) (93-5) 61883-91.

Colonisation schemes advocated to develop areas not at present under cultivation (*Pan, etc.*) (194).

Efficiency of Burman labour as compared with other Indian and with British labour (*Dunn*) (97-8) 61926-40.

Immigration from Indian Peninsula during reaping season, might be reduced by one-third if gambling ceased (*Pan, etc.*) (194).

Labourers, field, unemployed period (*Dan*) (238).

Labouring population with little land being created while average size of holdings is increasing; legislation to prevent this would be ineffective without co-operative organisation of the small-holder (*Dunn*) (91-2) 61867-70.

Machinery, introduction of, would oust manual labourer from his occupation (*Tun, etc.*) (207).

MIGRATION:

of Labour to rice fields from Madras and Upper Burma (*McKerral*) (48) 61439-40 No displacement on land of Burmese by Indians (48) 61441-3. Seasonal, well developed (*Dunn*) (68). Government and co-operative societies probably cannot control (68).

Myitkyina District: colonisation measures adopted by Government (*Shwe, etc.*) (392).

Public Works Department and district councils might employ cultivators during the slack season (*Pan, etc.*) (198).

Roads, improved, and migration of labour (*Robertson*) (350) 64497-9.

Shortage of labour: in Burma (*Shwe, etc.*) (385); no shortage in one district (392); not appreciable; due to gambling (*Pan, etc.*) (194); labour-saving machinery the remedy (198).

Unemployment, a cause of the increase of crime (*Pan, etc.*) (198).

Wages: for harvesting rice, in kind, in paddy (*Pan, etc.*) (204) 63152; Rs. 10 a month with food and clothing (*Tun, etc.*) (214) 63243-7; high: should be fixed by law and labourers should be bound to as to prevent loss to cultivators (*Maung, etc.*) (171).

ANIMAL HUSBANDRY.

BREEDING:

Cattle do not thrive owing to neglect (*Shwe, etc.*) (378), (384).

Cattle-breeding entirely under the Agricultural Department (*Rippon*) (128) 62382; in the dry zone; Burmese bullocks a definite type. Indian cattle roam about the roadsides (130) 62414-20, 62430-8.

Control, very little exercised (*Robertson*) (345) 64396-7. Education or legislation, or both, necessary (342).

no Control exercised over (*McKerral*) (27) 61103-5; deterioration owing to crossing (28) 61109-13, (34) 61217. Government stock breeding farm opened but nothing done yet (41) 61313-4. Under the Agricultural Department (41) 61320-1.

ANIMAL HUSBANDRY—*contd.*

BREEDING—*contd.*

Cross-breeding, local cattle with English bulls (*Rippon*) (130) 62421.
Horse-breeding transferred to Military Police (*Rippon*) (128) 62383-5.
Indian blood : investigation of effect of slight admixture necessary (*Robertson*) (342); better milk, size and weight (346) 64421-2; introduces inferior strain but not disease (348) 64469-70.
In Lower Burma, none owing to swamp conditions (*Hendry*) (59-60) 61577-84.
Obstacles of lack of capital and religious prejudice (*Sein*) (352), (364-5) 64677-80.
Profits : favourable (*Robertson*) (343); (346) 64425, much less profitable than agriculture (*Tun, etc.*) (220) 63327.
Selection within Burmese breed advocated (*Robertson*) (342); give 7 lb. milk a day (346) 64417-24.
Shows advocated (*Robertson*) (343).
Buffalo : as a draft animal unpopular (*McKerral*) (26) 61082-5; numbers stationary and decreasing in proportion to bullocks (38) 61263-5.
Castrations : a few at Insein Veterinary College but none in the districts : by the Italian method (*Rippon*) (128) 62396-9; no attempt made to encourage (*McKerral*) (27) 61103-5; Registration and compulsory castration of cattle of nomadic Indians advocated (28) 61109-13. People have no prejudice against (36) 61243.
Condensed milk : imports of the value of 41 lakhs of rupees for the year 1925-26 (*McKerral*) (10), (27) 61098-102.

DAIRYING :

Benefit doubtful (*Pan, etc.*) (193).
None except at Sagaing (*McKerral*) (10) : insanitary conditions (11).
No religious objection to using milk, butter, etc., as food (*Sein*) (364) 64678.
Not usual owing to Burman religious objection (*Robertson*) (342).
Deputy Director of Live Stock Breeding proposed (*McKerral*) (26) 61078-80.

DRAUGHT ANIMALS :

Animals to pull heavier loads required (*McKerral*) (10); in the dry middle tract (20-1) 60977-82. More important than milk (26) 61081, (27) 61096.
Mainly Burmese; first cross with Indian not good (*Robertson*) (346) 64417-20; treated better than breeding cattle (*Robertson*) (343) 64425-9; 2 pairs for 40 acres (*Gyi, etc.*) (399-400) 64832-3, (401) 64850; usually bought; price very much increased (401) 64850-5, (402) 64883.
Satisfactory in Insein District; area ploughed by a yoke of bullocks (*Pan, etc.*) (201) 63075-85, (204) 63141-4.
Epidemics : cause serious loss to agriculturists (*Tun, etc.*) (211) 63195-6.

FODDER :

Bhoosi, high cost of, causes deterioration of cattle; export duty advocated (*Tun, etc.*) (208), (211-2) 63198-206.
Burning of straw and dry grass in the dry season should be stopped (*Shwe, etc.*) (384).
Crops : paddy stubble, jowar stalks and bean husks (*Shwe, etc.*) (391).
Forest reserve pastures should be increased (*Shwe, etc.*) (384).
Green : serious effect of almost total absence of, during dry season (*Robertson*) (343). Insufficient for breeding cattle (343).
Hay is made (345) 64398-9.
In Insein District sufficient grass and paddy straw; kaing grass available in dry seasons in lowland areas. Scarcity may exist for 4 weeks (*Pan, etc.*) (192-3), (201) 63084. Plenty in Lower Burma (197). In Pegu District shortage during working season; paddy straw stored but grass more nourishing (201-2) 63084-91.
Insufficiency of (*McKerral*) (11); in the dry middle tract (20-1) 60978-80.
Jowar : damaged by pest "Pwinbyu" (*striga lutea*); methods of resisting (*Robertson*) (343), is stored (345) 64400-2.
Landowners need instruction as to (*Shwe, etc.*) (384).
Manuring advocated (*Robertson*) (343).
Numbers of cattle should be limited (*McKerral*) (11).
Paddy straw should be more carefully conserved (*McKerral*) (11).
Scarcity : due to Peninsular Indians, non-agriculturists, keeping cattle; scarcity very much felt from March to June (*Gyi, etc.*) (398); for 120 days from March to June (*Shwe, etc.*) (384); for 8 weeks from October to December (392).
————, Season of great shortage : March-May (*Robertson*) (343).

ANIMAL HUSBANDRY—*concld.*

FODDER—*contd.*

Silo, pit: advocated (*Robertson*) (343); has never known a cultivator to dig one (345) 64403-4; experiments successful but not adopted by cultivators (*McKerral*) (27) 61091-7.
Storage (*McKerral*) (33) 61191-9.
Water storage by weirs, advocated (*Shwe, etc.*) (384).
Well-irrigated grass advocated (*Robertson*) (343).
Goats are pests (*McKerral*) (26-7) 61086-9.
Grazing: enclosed pastures, none (*Pan, etc.*) (193); absence of, not source of injury to cattle (197); none (*Robertson*) (343).
————Forests, *see under that title.*
————grounds, inadequate (*Tun, etc.*) (208).
————, no grazing grounds in Chindwin district (*Gyi, etc.*) (398).
————, over-stocking of common pastures, not cause of injury to cattle (*Pan, etc.*) (197).
————shortage, serious effects of (*Robertson*) (342).
———— sufficient (*Pan, etc.*) (193).
Horse racing, encouragement of, by Government officials, deprecated (*Tun, etc.*) (207-8).
Import of cattle from Indian Peninsula should be stopped or controlled (*McKerral*) (10), (27) 61090. Trade not large (33) 61189-90.
Indebtedness: caused by loss of cattle (*Tun, etc.*) (206), (211) 63195-6.
Indians, non-agriculturists, keep half starved cattle in Burma (*Hopwood*) (119-20) 62261-4; should be heavily taxed (122) 62317; Burmans keep a few well-fed animals (125) 62349; (*Gyi, etc.*) (398).
Milk supply, in large towns unsatisfactory; Government or co-operative societies should undertake (*Pan, etc.*) (197), (201) 63067. (*See under* **WELFARE OF RURAL POPULATION.**)
Mineral constituents, no injury to cattle through lack of (*Pan, etc.*) (197).
Numbers of livestock (*McKerral*) (11), (55) 61534-7.
Pastures: generally over-stocked (*McKerral*) (11); cattle, sheep and goats kept by parasitic Indians paying no land revenue (11); compulsory registration and castration advocated (28) 61109-13.
Pathways, lack of, to grazing grounds (*Maung, etc.*) (169).
Prices of plough cattle, three times what they were 30 years ago; due to enormous slaughtering of cattle by licensees (*Tun, etc.*) (206), and disease; inadequate veterinary staff (217) 63285-7, (220) 63321-8, (222) 63348-52.
Rinderpest: serious: 100,000 deaths in some years (*McKerral*) (27-8) 61106-8.
Sheep are pests (*McKerral*) (26-7) 61086-8.
Shows, exhibitions, and competitions; prizes should be given to improve breeds (*Tun, etc.*) (207).
Trade, trans-frontier: ponies, mules and cattle used (*Rippon*) (130) 62427-9.

AUNG, U TUN (witness) (*see under* **MAUNG, U BA,** *etc.*).

BASKET (as a measure) (*see under* **MARKETING**).

BASKET MAKING (*see under* **AGRICULTURAL INDUSTRIES**).

BEE-KEEPING (*see under* **AGRICULTURAL INDUSTRIES**).

BROKERS (*see under* **MARKETING**).

BUDDHISM (*see under* **WELFARE OF RURAL POPULATION**).

BUFFALO (*see under* **ANIMAL HUSBANDRY**).

BULKELEY, J. P., M.A., I.E.S., Officiating Director of Public Instruction, Burma (134-147).

ADMINISTRATION:

District councils, transfer of control of vernacular education to, has been successful in every way except financially (142) 62570-3.

EDUCATION:

Adult education in rural tracts:
Christian Missions Village Education Committee, 1920, work on similar lines advocated (134).
Demand for, has not expressed itself (136) 62504.

BULKELEY, J. P.—*contd.*

EDUCATION—*contd.*

Establishment of national form of Government, must probably wait for, or until district councils have sufficient enlightenment and funds (135), (142) 62575. Comparison with England and Punjab (143) 62580-3.

Magic lantern lectures, cinema (134).

Voluntary agencies, lack of (134). Political feeling an obstacle; compared with Madras (142-3) 62576-9.

Agricultural bias: will not lead to much improvement (135); but more might be done in this direction. Better trained teachers required (139) 62538-40.

Agricultural Department's short courses for adolescents (144) 62594-5.

Arithmetic, Burmese have average ability for (138) 62523-4.

Attendance at schools: money wasted owing to children leaving school prematurely (135); this the chief reason of failure (139) 62536-7. Compulsion necessary to stop this waste (146) 62615-6.

Books, in the vernacular, not ideal, but quite useful (139) 62536-7; Text Book Committee (141) 62563. (*See under* 'Libraries' *below.*)

Compulsory education the only cure, but can only be gradual and should be accompanied by levy of an education rate (135). Compulsion Act contemplated (137) 62513. Education cess (142) 62570-3. Difficulty with regard to monastery schools (143-4) 62584-8, (146) 62615-6.

District councils, transfer of control to, has been successful in every way except financially (142) 62574.

English, great demand to learn (136-7) 62504-8. Knowledge of, leads to dislike of manual labour (147) 62621-4.

Expenditure in 5 years, 1922-27, increased from 116 to 193 lakhs, figures (139-140) 62541-4.

Government action suspect for political reasons (142) 62575. Comparison with England and the Punjab (143) 62580-3.

Incentive, Government service (134-5). Government to some extent responsible for this materialist view (141) 62564-6, (145-6) 62606-8.

Inspection of schools, insufficient staff; standard has been lowered while awaiting Superior Provincial Service (141) 62555-63.

Libraries, need of (134); Government should start (142) 62575, (145) 62601-5. (*See under* 'Books' *above*).

Manual labour, education may cause a dislike for (147) 62621-4.

Moga system (141-2) 62567-9.

Monastery schools: majority of population attain literacy in unrecognised schools. Do not accept girls (136) 62500-1. Possibilities of improvement doubtful (137) 62509-12. Difficulty in connection with compulsory education. A considerable number receive aid from Government. Number of students. Discipline spasmodic (143-4) 62584-92.

Nature study: not agricultural education but general education; unpopular as not assisting students to pass examinations; propaganda, etc., necessary (134). Punjab system not suitable for Burma; definite vocational training should not be introduced in normal schools. Government has refused financial aid (137-8) 62514-20. Boys and girls equally interested in (138) 62525-6.

Newspapers: recent considerable increase in circulation of vernacular newspapers (136) 62502.

Primary: general desire for (135) 62497-8. Majority of schools have more than one teacher. Average number of students (140) 62550-3. Difficulty with regard to monastery schools (143) 62584-8.

"Project" methods will help (135); Moga (141-2) 62567-9.

Punjab system of agricultural training schools not suitable to Burma (137) 62514-6; because so few middle schools large enough to have farms attached to them (144) 62593, (146) 62609-14.

Schools: bad; curriculum not much to blame (135).

School farms, combine general and vocational education which is seldom successful; would be costly and unpopular (134), (145) 62596-600.

School plots: *see under* NATURE STUDY *under* **EDUCATION.**

Teachers: pay has been recently greatly improved (135); figures (140) 62544-7. Training doubtful (135). Large number of qualified women teachers (138) 62528. Better trained teachers required (139) 62538-40. Standard of training has not been raised with increased pay (140) 62554. Women paid the same as men (146-7) 62617-20.

BULKELEY, J. P.—*concld.*

EDUCATION—*concld.*

Vocational training, definite, should not be introduced in ordinary schools (137) 62514-6. Objection not so strong against agricultural as against industrial vocational training (145) 62596-600; (146) 62609-14.

Women: not so well educated as men but more advanced than in Indian Peninsula (136) 62499. Monastery schools will not accept girls. Illiteracy of mothers encourages relapse into illiteracy of children (136) 62500-3. Boys and girls equally interested in gardening. Provision of separate schools for girls after a certain age would keep them longer at school. Large number of qualified women teachers. Financial difficulties. Classification as between boys and girls' schools misleading (138-9) 62525-35. Difficulty of sending women teachers to lonely villages; should be recruited locally (140) 62548-9. Women teachers paid the same as men (146-7) 62617-20.

BULLOCKS (*see under* DRAUGHT ANIMALS *under* **ANIMAL HUSBANDRY**).

BURMA PROVINCIAL CO-OPERATIVE BANK (*see under* CO-OPERATION *under* **SEIN, U**).

BURMA VILLAGE ACT:

Gives power to District Officers to deal with cattle disease (*McKerral*) (10); forbids villagers to live on their holdings, but is now in this respect a dead letter (46) 61397; enacted to prevent crime (52) 61497; restrictions on villagers living on their holdings should be abolished (*Tun, etc.*) (208), (213) 63223-4; (*Sein*) (353-4), (364) 64667-9; probably desirable to relax Police restrictions compelling people to live in the villages (*Dunn*) (96) 61908.

CAPITAL, ATTRACTING OF, TO AGRICULTURE.

Attracting capital to agriculture is impossible (*Pan, etc.*) (195).

Capitalists should not be allowed to take to agriculture; if they do, small cultivators will become landless tenants (*Sein*) (353).

Exemption from rates and taxes, and Government loans should be given, to encourage enterprising Burmans to cultivate land by machinery (*Pan, etc.*) (199).

Government estates, present policy with regard to formation of, objectionable (*Pan, etc.*) (199).

Government should supply capital (*Sein*) (353).

IMPROVEMENT OF LAND BY OWNERS PREVENTED:

By lack of capital (*Sein*) (353); by ignorance (*Pan, etc.*) (195); want of funds; knowledge of power farming machinery and help from district officials (199); by indiscriminate leasing of land (*Shwe, etc.*) (387); lack or excess of water (393); discouraged by want of co-operation among landowners and banking facilities (*Dawson*) (255); factors tending to discourage (*McKerral*) (13).

Land a popular form of investment (*McKerral*) (12).

Land tenure, restricting alienation, discourages investment of capital (*Dunn*) (96) 61906.

Large estates, formation of, leads to absentee landlordism or to capitalist enterprise and formation of large landless class (*McKerral*) (12), (35) 61231-2.

Price of rice relatively lower than before the War (*Dunn*) (69); but absolutely higher (96) 61905.

Profits of agriculture must be increased (*Dunn*) (69).

Thrift, advantages of, not appreciated (*McKerral*) (13), (53) 61504-10.

Zamindari system should be recognised by Government in the delta (*Dawson*) (255), (258) 63707-10.

CAPITATION TAX.

Labourers should be exempted from (*Tun, etc.*) (208); under Burma Rural Self-Government Act, 1921, district councils have option to convert into a tax on circumstances and property; but has not been done owing to opposition of Government; should be done (221) 63332-42.

CATTLE BREEDING (*see under* **ANIMAL HUSBANDRY**).

CENTRAL AGRICULTURAL RESEARCH COMMITTEE (*see under* **ADMINISTRATION**).

CHARLTON, J., M.Sc., F.I.C., I.A.S., Principal, Agricultural College, Mandalay.
Experience (283) 63929-31 ; (279-97).

AGRICULTURAL INDUSTRIES :

Sugarcane, improved furnaces, popular, but demonstration staff insufficient and small area under sugarcane (290) 64058-63.

CROPS AND CROP PROTECTION :

Diseases (289) 64038-42.
Sugarcane, improved furnaces, numbers increasing, but shortage of demonstration staff and small area under sugarcane (290) 64058-63.

EDUCATION :

Agricultural : in Burma generally considered to be a subject of secondary importance (297) 64169-70.
Economics, agricultural, taught at Mandalay College as part of the agricultural course (296) 64167.
High School Final examination : increasing number of students offering agriculture (279) ; (289) 64046-50.
Incentive to study agriculture : Government service (280).
Mandalay Agricultural College and Research Institute :
College Council : Deals with questions as to teaching and programme of studies (290) ; consists of Principal and heads of all teaching sections ; meets when necessary ; does not discuss research programme which is settled by the Director (292) 64084-8, Director of Agriculture is the immediate superior of the Principal (290) 64064-7.
Cost of teaching (282-3) ; 41 students costing Rs. 80,000 per annum (293) 64110-2.
Diploma might be held equivalent to B.A. and B.Sc. of Rangoon University as qualification for teaching in Government high schools (279).
Governing body for, question of (295) 64141-3.
Research : Danger of College becoming partly an Arts College ; research work should be concentrated as far as possible in the College (290-1) 64068-74 ; responsibility for (289) 64043.
Students : Agricultural Committee, 1925, recommended that past students should be employed in branches of public service other than agriculture (291) 64082. Applications for entry comparatively few because other services offer better prospects than Agricultural (280-1), (286) 63985-6 ; absence of *awza* in Agricultural Service (280), (283) 63941-2. Number of, slightly improved this year ; in about 4 years Agricultural cadre will be filled and number of vacancies will be very small ; not one student has gone back to his farm ; average student on leaving is fit for Subordinate Agricultural Service ; possibility of having to find men for Provincial Agricultural Service ; obligation to give students posts in Agricultural Department, which they are bound to accept. Leave College at age of 21 to 24 ; not advisable to raise qualifications for admission to College in the immediate future ; no co-ordination with Rangoon University whose Intermediate College is at Mandalay ; most students come from Lower Burma ; very few sons of cultivators (283-4) 63935-54 ; very few good at chemistry, weak in English, fairly good in arithmetic (285) 63966-9 ; comparison with position in Poona and Britain 30 years ago (285) 63970-80 ; Rangoon University graduates will not come to Mandalay to work as research students at pay of Rs. 150 to Rs. 300 (288) 64029-30 ; 35 out of 40 students are stipendiary ; no scholarships given by local people (289) 64044-5 ; stipends withdrawn on many occasions (292) 64095-9 ; records of parentage and after-careers ; small number of third-year students recruited in 1925 still remaining ; students not knowing Burmese not recruited ; Subordinate Civil Service, Land Records and Subordinate Co-operative Branch, filled by competitive examination ; it would not help students of the College if agriculture were included ; knowledge of English inferior to that of men taking regular degree ; agricultural economics taught as part of the agriculture course (296-7) 64155-68 ; selection : no preference given to those drawn from agricultural classes ; Selection Board consists of Development Commissioner (now called Financial Commissioner, Transferred Subjects), Chairman, Director of Agriculture, the Principal of the College, Principal of High School at Rangoon, and a Burmese Barrister-at-Law (297) 64172-6.
University affiliation, difficulties, (281-2), (285-6) 63981-4, (291) 64075-81, (292) 64089-94 ; Principal not a Member of Senate of Rangoon University (293-4) 64118-32, (295) 64141-3.

CHARLTON, J.—*contd.*

EDUCATION—*contd.*

Pyinmana, American Baptist Mission School: still in an experimental stage (284) 63956-7; well attended by sons of cultivators, between 50 and 60 students, an expensive school (294-5) 64133-40.

Rangoon University: no co-ordination with Mandalay Agricultural College, which is not affiliated (281-2); Principal not a Member of Senate (293) 64118-20, (284) 63948-51, (289) 64032-7; teaching of sciences relating to agriculture (290) 64068-9; consists of three Colleges: University College and Judson College in Rangoon and Intermediate College, Mandalay (294) 64123-4.

Research, not assisted by association with elementary teaching (285) 63964-5.

Students, comparatively few sons of cultivators (280).

Teachers of agriculture, should preferably be drawn from agricultural class (297) 64172-5.

Teaching facilities, agricultural, urgent need for extension (279); difficulty of getting competent teachers (295) 64138-40.

University: questionable whether it should confine itself to purely theoretical work or should interfere in applied work (284) 63955; specialisation should be preceded by a good basis in pure science (286) 63987-96.

FERTILISERS:

Ammonium sulphate and superphosphate, only useful sources of nitrogen and phosphate for paddy (280).

Ammo-phos: has proved to be profitable (280); no commercial firm advertising and pushing sale of (284) 63960-2.

Artificial, prices too high (280).

Basic slag: tests insufficient (280).

Bone flour, ground, possibly of some use in sour paddy soil of Lower Burma (280), (288) 64018-26.

Cyanamide: tests insufficient (280).

Dhaincha plant as a green manure for paddy (290) 64053-7.

Green manuring, not practised (290) 64051-2.

Lime deficiency in nearly all paddy growing districts of Lower Burma (280), (288) 64018-26.

Nitrates useless on wet lands (280).

Nitrogen, general shortage of (280).

Pelun, a leguminous plant, used as a green manure (290) 64053-7.

Phosphate, shortage of, in many districts (280).

Potash, rarely necessary for paddy (280).

Research, insufficient; knowledge of secondary changes exceedingly important (280), (284) 63963, (288) 64016-7.

Urea being investigated, but not hopeful (280), (284) 63963.

RESEARCH:

Agricultural Chemist, Burma, responsible for teaching, research and routine work, unable to leave Mandalay and become really conversant with agricultural problems in various parts of the Province; assistant lecturers should be appointed and Rs. 2,000 travelling expenses allowed (279); is also at present Principal of Mandalay Agricultural College and Agricultural Engineer (283) 63929-34, (287) 63997-9, (288) 64027-8; is not Member of Board of Faculties of University of Rangoon (288) 64031.

Agricultural Engineer: Agricultural Chemist and Principal of Mandalay College at present acting as, (283) 63933; a very important post; holder has resigned and assistant offered his resignation; should be on the superior establishment (295-6) 64144-54.

Co-ordination of central and provincial research: very little; Pusa might co-ordinate work of Provinces; inspection would not be helpful but conferences might (287-8) 64000-15; equipment equal to any in India (293) 64107-9.

Insectary, lack of, at Mandalay (279), (284) 63958-9.

Plant diseases (289) 64038-42.

Pusa, no contact with; might co-ordinate work of Provinces (287-8) 64000-15, (293) 64107-9.

Soil analyses: useless without accurate knowledge of the district (292-3) 64101-3.

Soil survey: by the Agricultural Chemist (292-3) 64101-6.

Teaching, elementary: association with, does not assist research (285) 63964-5.

Weeds: (289) 64038-42.

CHARLTON, J.—*concld.*

SOILS :

Survey by Agricultural Chemist (292-3) 64101-6 ; very imperfect, but some definite information obtained; samples taken by the auger to depth of 6 or 7 ins. (297) 64177-82.

WATER HYACINTH :

Research necessary as to insect, fungus and bacteriological enemies (279); nobody actively engaged on now (297) 64171.

Sprays, chemical : merely mitigation ; only arsenical sprays likely to be effective (279) ; but cannot be used as thay would poison cattle (289) 64038.

COMMUNICATIONS (*see under* TRANSPORT *under* **ADMINISTRATION**).

CO-OPERATION.

Adult education : an important instrument for (*McKerral*) (29) 61137 ; an opening for societies (*Maung, etc.*) (181) 62869-70.

Agricultural associations not run by co-operative societies (*Hendry*) (59) 61578.

Agricultural Department not directly concerned with (*McKerral*) (46) 61398-410.

Audit : cost should be borne by Government (*Maung, etc.*) (185) 62940-9 ; (*Sein*) (368) 64723-4 ; primary, by Co-operative Council, good but broke down owing to lack of funds to pay auditors (*Tin*) (113) 62182-6.

Better farming and better living societies : hopeful if Agricultural Department assist (*Sein*) (357) 64550-1.

Buddhist Priests : many have nothing to do with worldly affairs but some have started societies (*Tin*) (114) 62201-2 ; unregistered, in some cases successful (*Dunn*) (88) 61836-7, (89) 61853-7.

Burma Co-operative Association, unofficial ; activities limited (*Tin*) (110) 62113-8.

BURMA PROVINCIAL CO-OPERATIVE BANK, LTD., MANDALAY: *see under* **SEIN, U.**

Canals and embankments, difficulty of organising to maintain, when unanimous consent necessary (*Dunn*) (69), (80) 61770-1.

Capital of societies (*Tin*) (113) 62180-1.

Cattle breeding societies : should be formed as an experiment (*Shwe, etc.*) (386) ; Registrars should circulate advice (390) ; obstacles of lack of capital and religious prejudice (*Sein*) (352).

Cattle insurance : not working well (*Tin*) (114) 62203 ; failure of (*Dunn*) (75-6) 61732-5.

Colonisation Department, now Government Estates Department (*McKerral*) (48) 61432-3.

Colonisation societies : land leased from Government, allotted by committee ; Government advanced money, but not enough, leading to resort to moneylenders. A success. Eighty-two such societies at present. Yitkangyi Colony (*Maung, etc.*) (184-5) 62920-39. Pegu Kayan Railway not of much use to Colony (186) 62964-6. No improved methods of cultivation used (186-7) 62974-9. Land belongs to Government (189) 63017-9.

Conferences : district, once a year and provincial once in four years (previously two years) (*Sein*) (361) 64617-20, (369) 64750-6.

Consolidation of holdings societies advocated (*Shwe, etc.*) (386)

Continuity of department broken (*Dunn*) (73) 61719 ; in a very bad state (73) 61723 : (88-9) 61843-52 ; superior officers not regular departmental officers (102) 61981-9

Cottage industries societies should be introduced among housewives (*Sein*) (352).

Credit, Co-operative, is the cheapest (*Gyi, etc.*) (397) ; (400) 64846.

CREDIT SOCIETIES :

(*Tun, etc.*) 206-7 ; not generally in competition with joint stock banks, but complementary (*Dawson*) (258) 63718-21 ; unsuccessful owing to high interest, insufficient finance and lack of long term loans (*Sein*) (352) ; none really successful (353) (*see under* BURMA PROVINCIAL CO-OPERATIVE BANK *under* **SEIN, U**). Committee of management in each society prepares forecasts, upon which Government officer fixes maximum borrowing limit ; Committee sanctions loans to individual members (*Sein*) (363) 64649-51 ; Committees take sufficient interest but societies are unsuccessful because incomes of members are too small for them to make repayments (363) 64652-4 (*see* STANDARD OF LIVING *under* **WELFARE OF**

CO-OPERATION—*contd.*

CREDIT SOCIETIES—*contd.*

RURAL POPULATION). Audit should be done by Government free (*Sein*) (368) 64723-4; weaknesses of (*Maung, etc.*) (177); should be put in order before starting sale societies (181) 62865-6. Reserves (181-2) 62882-6. Present demoralisation of, calls for strong Government action (*Pan, etc.*) (194).

Debt: priority should be given to that owing to societies and imprisonment for debt due to private individuals should be abolished (*Maung, etc.*) (172).

DECLINE IN MOVEMENT:

Mainly due to relaxing of Government supervision (*Tin*) (105-6) 62008-14; which should be done gradually (109) 62079-82. Supervision should take the place of super-audit (109) 62084-7. Failures due to small margin and high cost of management (109) 62088-90; not due to rate of interest being too low, nor to cultivators' fear of offending moneylenders (110-1) 62121-33. Upper Burma (114) 62203-13.

DEPARTMENT:

Comparative size of (*Tin*) (109) 62083; should give more advice and support (*Shwe*) (394) 64811-2; officers (except Registrar) should act merely as propagandists and instructors (*Maung, etc.*) (174). Relations with non-officials good (187) 62989-91. Staff inadequate (177).

Deposits: mainly from public. Under Act III of 1923, local bodies can deposit their funds with the Central Banks approved by Local Government, but so far Government have refused sanction (*Maung, etc.*) (188) 63003-10. Could be obtained from public at lower interest if Government made loans to societies (188) 62011-6.

Discipline: a Burman quality (*Sein*) (370) 64757-9.

Dry zone districts, failure of societies in (*Dunn*) (82) 61791.

Educational influence (*Tin*) (110) 62112, (113-4) 62187.

EDUCATION:

Co-operative training schools should be opened at expense of Government (*Maung, etc.*) (177); has not been neglected (178) 62824; (*Dunn*) (72) 61712-4. Principles should be taught in village lay schools (*Sein*) (353); members well educated in principles; should be done mainly by non-officials (359-60) 64590-5.

EINME TOWNSHIP BANK: *see under* CO-OPERATION *under* **MAUNG, U Ba,** *etc.*

Finance: interest 15 per cent on personal security of members, loans extended in bad years; Co-operative finance best method (*Tin*) (105). Reserve fund, share capital, current profits, loans: movement solvent (113) 62167-79.

Financial Commissioner for Transferred Subjects to co-ordinate Co-operative and Agricultural Departments (*McKerral*) (46-7) 61398-426.

Fragmented holdings, societies for aggregation of, do not exist (*Maung, etc.*) (178); would not be of much use in Burma (*Sein*) (352).

Godowns: receipts for produce could be used for credit purposes (*Dunn*) (70) 61683 (*see* SALE SOCIETIES *below*).

Government Estate Department's colonies (*Dunn*) (93-5) 61883-91.

GOVERNMENT:

Should encourage (*Tun, etc.*) (211) 63188, (*Gyi, etc.*) (399); should lend to societies at low interest (*Shwe, etc.*) (388), (393); should exercise closer supervision and give more assistance (390); should take charge of Co-operative Council (393), (394) 64813, 64819-20; should provide funds (*Sein*) (351), (368) 64725; at 5 per cent (355) 64500-7; should have entire control (352), (363) 64658-9 (*see under* BURMA PROVINCIAL CO-OPERATIVE BANK *under* **SEIN, U**). Is expected to do everything for the people (362) 64635-6. Should do audit free (368) 64723-4. State bank advocated (368) 64725; loans should be made through co-operative societies (*Maung, etc.*) (172), (177); should not provide money (*Dunn*) (69).

GUARANTEEING UNIONS:

Functioning badly (*Dunn*) (83) 61793-8; system unsatisfactory and should be abolished (*Sein*) (363) 64645-8; recommend loans and guarantee repayment to Central Bank; the last resort in liquidation (*Tin*) (112) 62145-54; in some cases have had to pay (*Shwe, etc.*) (395) 64821-7.

CO-OPERATION—*contd.*

Health improvement work in rural parts not done by societies who do not consider it their work (*Maung, etc.*) (189-90) 63022-34.

Implements, should be distributed by Government or co-operative societies at cost price and by easy instalments (*Pan, etc.*) (197).

IMPROVEMENTS, SOCIETIES FOR EFFECTING :

Should be tried as to irrigation and drainage (*Sein*) (352); should be tried where there are fisheries and canals (*Maung, etc.*) (177-8); advocated as an experiment (*Shwe, etc.*) (386); should be established after formation of health service under district councils (*Jolly*) (147); distribute quinine; no anti-malaria societies (157) 62674-5; not giving medical assistance, not considered to be part of their work (*Maung, etc.*) (189) 63024-33.

Industrial societies should be financed by Government (*Maung, etc.*) (177).

Initiative, lack of, in societies (*Dunn*) (69).

Interest (*see under* **FINANCE**).

JOINT FARMING SOCIETIES :

Consisting of families are best (*Ghosh*) (329), (337) 64343-6; do not exist but should be introduced where credit societies are successful (*Maung, etc.*) (178); premature, difficult problem of unity; should be introduced when co-operation generally is successfully established (*Sein*) (352); require advice of Registrar (*Shwe, etc.*) (389).

Labour societies for contract work should be formed (*Maung, etc.*) (178).

Land mortgage banks : should be merged in Central Banks (*Maung, etc.*) (177).

LIABILITY, UNLIMITED :

Is understood by members; has not been enforced yet (*Maung, etc.*) (183) 62898-900; a good thing (*Shwe, etc.*) (394) 64806.

LIQUIDATION :

Act gives liquidator, with approval of Registrar, power to recover contributions as arrears of land revenue. Delays in liquidation due to appointment of honorary liquidators. Paid liquidators then appointed and now Junior Assistant Registrars (*Sein*) (361) 64611-6; official liquidators paid by Government (361) 64622-4. Caused by crop failures owing to flood and drought (*Maung, etc.*) (178-9) 62824-5. 300 societies; outstanding liabilities 10 lakhs; 12 per cent recovered in one year; sale of members' land, unlimited liability of members called upon in one case; guaranteeing unions; eight years to liquidate owing to employment of non-officials (*Tin*) (112) 62145-61. 500 societies (*Dunn*) (73) 61717-8; policy as to winding up (89-90) 61858-60.

Literature issued by department in vernacular (*Tin*) (110) 62105-8.

Litigation, Government servants should give assistance to societies engaged in (*Maung, etc.*) (174-5).

Local bodies have power to deposit funds in Central Banks, but have not done so owing to opposition by Government (*Sein*) (367-8) 64717-22.

Long-term loans : necessity of : Government should provide funds at first (*Maung, etc.*) (175); at 5 per cent per annum (176); careful supervision necessary (179) 62825-32, (181) 62863-4. Land mortgage banks should be merged in Central Banks (177); (*Shwe, etc.*) (388).

Lower Burma wet tract, movement satisfactory in (*Tin*) (106) 62024-7.

Machinery, agricultural, joint use of : should be undertaken by credit societies (*Shwe, etc.*) (386); requires advertisement by Agricultural Department (389). Societies for use of : cultivators not in a position to utilise (*Pan, etc.*) (194); do not exist, but would be useful (*Maung, etc.*) (178); would be advantageous if working with their own money and not with money borrowed from banks (*Sein*) (352).

Management of primary societies, cost too high; majority of members take an interest in management (*Tin*) (109) 62090-9.

Manure societies (*Sein*) (362) 64634.

Meetings : of most societies properly conducted; 90 per cent attendance of members at annual meetings of primary societies (*Maung, etc.*) (179-80) 62833-45.

Members : average per society 50 in Pegu District (*Maung, etc.*) (179) 62835-7; importance of members understanding principles (*Shwe, etc.*) (394) 64809-10.

Middle dry tract, movement particularly disappointing, owing to bad seasons (*Tin*) (106) 62015-23.

CO-OPERATION—*contd.*

Milk supply in large towns extremely unsatisfactory; Government or co-operative societies should undertake (*Pan, etc.*) (197).

Minorities, compulsion on, to come into schemes of joint improvement (*Sein*) (353); (*Dunn*) (69); (*Jevons*) (268) 63828; (*Shwe, etc.*) (386); (*Gyi, etc.*) (399); should not be compelled (*Pan, etc.*) (194); not feasible as to irrigation (*Shwe, etc.*) (393); restrictions in Burma Rural Self-Government Act, 1921, should be removed (*Dunn*) (69).

MONEYLENDERS:

Members of societies borrow from moneylenders at 36 and 60 per cent after crop failures (*Sein*) (357-8) 64552-5. Moneylenders do not regard co-operative movement as a serious competitor (360) 64601-2; live in luxury by exploiting cultivators (367) 64703-6; have not been driven away by credit societies (*Maung, etc.*) (182) 62894-7, (186) 62954-63.

NON-OFFICIALS:

Failure of (*Dunn*) (69), (82) 61791, (95) 61896-8; activities limited (*Tin*) (110) 62113-8.

Honorary organisers, instruction of (*Maung, etc.*) (172), (187) 62984-8; travelling expenses should be borne by Government (177). Inefficiency of control by (183-4) 62918-9. Intimate association necessary between officers of Department and members of societies (172-3), (174). Relations good (187) 62989-91. Non-officials have not sufficient spare time (188) 62996-63002. Honorary organiser of Einme Township Bank appointed by Deputy Commissioner (*Maung, etc.*) (190) 63035-8; help insufficient (*Tun, etc.*) (216) 63271-8; receiving encouragement from Department (218-9) 63302-9; should do propaganda (*Sein*) (352), (363) 64655-7. Objection to exclusion of, from board of control of proposed Land Mortgage Bank. Provincial Bank and Central Banks managed by (*Sein*) (366) 64691-7; should help by propaganda, newspapers, schools, etc. (*Shwe, etc.*) (389).

Objects of societies: achieved to a small extent (*Maung, etc.*) (173); not yet achieved (175); (*Pan, etc.*) (194); (*Shwe, etc.*) (386), (393).

PAYITKON CENTRAL CO-OPERATIVE SOCIETY: *See under* CO-OPERATION *under* **GYI, U YIN,** *etc.*

A successful purchase society (*Robertson*) (340-1).

Political agitation against Government societies (*Dunn*) (89) 61853-7.

PRIMARY SOCIETIES:

Have not been neglected in favour of central societies (*Dunn*) (82-3) 61792; Membership (*Tin*) (107) 62046-8.

PROGRESS:

None (*Dunn*) (69); owing to excessive dependence on Provincial Banks (69); promising in the earlier stages (72) 61709-11, (73) 61715-6; very bad state of things (73) 61723; (81) 61777-83; not flourishing so well in Upper Burma as in Lower Burma (*Tun, etc.*) (211) 63188; not so active as 5 years ago (216) 63271-3; recent setback (*Dawson*) (258) 63718; lack of, due to non-payment of dividends and not operating as saving societies (*Jevons*) (271) 63865-6. Movement going backwards; enquiry called for (*Sein*) (367) 64712-6; due to higher standard of living though Burmans more advanced than in the Indian Peninsula; lack of capital; not due to bad report issued by Registrar which was justified by the facts; societies in the dry tracts in a very bad way; education and knowledge of co-operative principles good; lack of cheap credit; land mortgage banks will give relief (368-9) 64726-41; enquiry as to cause of decline advocated (*Shwe, etc.*) (388), (394) 64814; slow because loans are not utilised for purposes for which granted (*Gyi, etc.*) (400) 64846-7.

Propaganda: none being done by Department except in Arakan; unofficial propaganda not sufficient (*Tin*) (106) 62029-34.

Provincial Co-operative Council, in a faint condition (*Dunn*) (95) 61897-8.

PURCHASE SOCIETIES:

Advocated (*Shwe, etc.*) (386); Government help necessary at first (389); (*Robertson*) (340-1); failure of, generally, but a successful society among police in Pegu

CO-OPERATION—*contd.*

PURCHASE SOCIETIES—*contd.*

District (*Maung, etc.*) (177); not many; should be started among members of credit societies, after reformation (*Sein*) (352); better than credit societies (*Gyi, etc.*) (401) 64859-60.

Recognition, greater, of societies, necessary (*Maung, etc.*) (174); no records of work done by department (*Tin*) (108) 62062-3.

Registrar, Junior Assistant, one should be appointed by Government in every district (*Maung, etc.*) (172).

Registrars: frequent change (*Dunn*) (73) 61719-22, (82) 61790, (95) 61892, should continue for at least 12 years (*Shwe, etc.*) (388).

Repayment: Time should be extended (*Shwe, etc.*) (390); period between repayment of loan and granting fresh loan; guaranteeing unions the final resort (*Tin*) (111-2) 62141-54.

Reputation of movement: Not damaged (*Maung, etc.*) (181) 62872-3; Government loan would improve prestige of co-operative banks (188-9) 63011-6; not very good (*Tin*) (107) 62043-5.

Reserve fund: 37 lakhs realised in cash (*Tin*) (113) 62167-70.

Revenue: payment should be postponed to 30th June (*Shwe, etc.*) (388).

SALE SOCIETIES:

Should be developed (*Dunn*) (73) 61724-5; groundnut societies satisfactory but ceased during War (*Tin*) (107) 62049-57, (108) 62074-6; complete failure of (*Maung, etc.*) (177); present conditions discouraging; Government help needed (*Pan, etc.*) (194); should store produce in godowns and make advances upon it (198). Societies for storage and sale of rice (*Edwards & Nelson*) (236) 63518-22. Advocated (*Robertson*) (340-1); (*Shwe, etc.*) (386). Should be started among members of credit societies, after reformation; should have godowns, built with their own money or intact reserve funds of credit societies (*Sein*) (352); not speculative (357) 64547-9. Unlucky attempt eight years ago leading to demoralisation. To build godowns long term loans repayable in ten years necessary; Provincial Bank cannot make such loans; application made to Government (361-2) 64625-33. Have collapsed, require finance (389); better than credit societies (*Gyi, etc.*) (401) 64859-60; very little co-operative marketing (*McKerral*) (28) 61122-4.

Seed distribution: help given to Agricultural Department (*McKerral*) (25) 61061-2; (*Maung, etc.*) (181) 62867-8, (185) 62950; (*Tin*) (106) 62035-6; help received from Agricultural Department (110) 62109-11.

Seed farms, little success (*Hendry*) (59) 61572.

SEED SOCIETIES:

For joint growing of pure strains and selling direct to millers, successful; premia of 10 to 15 per cent paid by millers for improved paddy (*Pan, etc.*) (191). Distribution should be to societies and not to individuals, to avoid mixing (191), (194).

Shares: 37 lakhs paid up in cash (*Tin*) (112-3) 62162-6.

Staff, training and recruitment: annual courses and examinations (*Tin*) (111) 62134-40; book-keeping and accountancy not strictly enforced subjects (114) 62188-91.

Statistics as to progress of societies (*Dunn*) (81) 61777-83.

Subsidiary employment on public works, roads, irrigation, supply of timber, etc., to railways, should be arranged by Co-operative officers (*Shwe, etc.*) (389).

Success, lack of (*McKerral*) (29) 61133-6.

SUPERVISION BY DEPARTMENT:

(*Tin*) (108) 62064-9; closer, necessary (*Shwe, etc.*) (390); withdrawal of, a cause of trouble in co-operative movement (*Sein*) (357) 64545-6; witness's changed opinion (361) 64621; Government should have entire control (352), (363) 64658-9; premature withdrawal of, cause of present disappointing condition of movement (*Maung, etc.*) (178) 62320-3, (183-4) 62918-9; not caused by political non-co-operation movement (187) 62980-3. Non-officials had not sufficient spare time (188) 62996-63002. Government supervision necessary (189) 63016; removed in 1921; movement desired it should be removed (190) 63039-43.

Supreme association, with non-officials in majority on controlling board, and subsidised by Government, should be formed (*Maung, etc.*) (174-5).

CO-OPERATION—*concld.*

SUPERVISION BY DEPARTMENT—*contd.*

Taccavi should be lent through co-operative banks at rates of interest not exceeding rate at which Government borrows (*Tin*) (104); but not for non-members (108) 62070-3, (110) 62119-20.
Taluka development associations compared with Agricultural improvement committees (*McKerral*) (50-1) 61472-9.
Tenants' societies should be formed and given leases of land (*Maung, etc.*) (177).
Thrift: has been promoted (*Tin*) (109) 62100; Burman has no sense of (*Maung, etc.*) (188) 62992.
Training and recruitment of subordinate staff (*Dunn*) (95) 61893-5.
Treasuries: societies should be able to deposit funds with (*Shwe, etc.*) (288).
Upper Burma: 4,000 credit societies, helping cultivators (*Tin*) (107-8) 62058-61, (114) 62203-13. Co-operation should not be abandoned in, (*Dunn*) (82) 61789.
Women: partly control spending of family income, are not excluded from co-operative societies (*Dunn*) (86-7) 61821-6; Registrars should form industrial, handicraft, saving and other societies (*Shwe, etc.*) (390).

COTTON (*see under* **CROPS AND CROP PROTECTION, MARKETING** and **TARIFFS AND SEA FREIGHTS**).

CREDIT (*see under* **AGRICULTURAL INDEBTEDNESS, FINANCE** and **CO-OPERATION**).

CRIME (*see under* **WELFARE OF RURAL POPULATION**).

CROPS AND CROP PROTECTION.

Adulteration of seed should be prevented by extensive pure seed distribution (*Hendry*) (60) 61586-7, (61) 61597-9.
Catch crops after paddy harvest unsuccessful (*Hendry*) (66) 61680.
Cattle trespass: many cases; for instance, a loss of Rs. 40 on 6 acres of juar (*Gyi, etc.*) (404) 64911-5.
Cinchona plantations under Government of India (*McKerral*) (55) 61532 (*see under* QUININE *under* **WELFARE OF RURAL POPULATION**).
Coffee grows well in Burma (*Dan*) (238).

COTTON: *see under* SEED DISTRIBUTION *below*, **MARKETING** *and* **TARIFFS AND SEA FREIGHTS**.

Cambodia, area small but increasing (*McKerral*) (8).
Seed, germination percentage low: (*McKerral*) (42) 61325.
Selected, premiums given for (*McKerral*) (8).
Value as a money crop (*McKerral*) (20) 60969-72; not much scope for improvement; conditions in Upper Burma very poor (*Edwards & Nelson*) (229) 63417-20; picked October and November (232) 63452-3.
Climatic difficulty of spreading improved strain in dry tract (*Robertson*) (344) 64376.
Destructive Insects and Pests Act, 1914, probably necessary to revise to protect Burma from pests from Indian Peninsula (*McKerral*) (9); should be done as soon as possible (26) 61073-5; by system of certificates (36) 61246-9.
Diseases (*Charlton*) (289) 64038-42.
Egret, preserved because a great insect feeder (*Tun, etc.*) (205).
Experimental stations in each Agricultural Circle undertake improvement of crops (*Hendry*) (57).

FODDER:

Difficulty of growing in paddy lands of Lower Burma (*Hendry*) (57).
Grasses (Guinea, Merker, foddercane, Kikuyu) introduced but not grown to any extent (*Hendry*) (57).
In Insein District not extensively put down (*Pan, etc.*) (192).
Many new crops tried but failed (*McKerral*) (8).
Paddy stubble, jowar stalks and bean husks only (*Shew, etc.*) (391).
Saccoline in Upper Burma (*Pan, etc.*) (192).
Foreign markets: varieties of paddy suitable for, should be made known to cultivators (*Tun, etc.*) (207).
Frogs: insect feeders (*Tun, etc.*) (205), (209) 63172-5, (222) 63364-5.
Fruit: importation from other countries best method of improving (*Hendry*) (57).
Garden crops, mixed, improvement work undertaken (*Hendry*) (57).

CROPS AND CROP PROTECTION—*contd.*

GRAM :

Distribution of immune varieties by Agricultural Department (*Tun, etc.*) (210) 63181-2.
Improved : increased yield 5 lakhs of rupees per annum (*McKerral*) (8).
Karachi : cultivation of, extending (*Dun*) (376).
————introduction in Upper Burma a great success (*Robertson*) (348) 64471-5 ; partly consumed by cultivator (*Gyi, etc.*) (401) 64868-70.

GROUNDNUTS : *see under* SEED DISTRIBUTION *below* **MARKETING** *and* **TARIFFS AND SEA FREIGHTS.**
Improvement of variety, scope for (*Edwards & Nelson*) (230) 63429 ; Agricultural Department working on right lines but staff inadequate (231) 63437-9 ; introduced during the last 20 years and covering 400,000 acres (*McKerral*) (8) ; oil extraction in India, oil and cake exported (40) 61300-3 ; introduction in dry tract has increased prosperity (*Robertson*) (343-4) 64374-5 ; no rotation (347-8) 64455-8 ; in Pakokku District, has brought in a large amount of money (*Sein*) (358) 64570.
Heavier yielding food crops should be grown, (*Shwe, etc.*) (382).
Hmawbi Government Farm distributing many improved varieties (*Dan*) (238), (240) 63575-9.
Improvement : Agricultural Department attemping to improve rice, cotton, beans, gram, chillies, groundnuts, sesamum, tobacco and juar ; all crops capable of improvement (*McKerral*) (8).
————No improvement (*Pan, etc.*) (197).
Juar : best fodder crops in the dry zone ; liable to fungus attack (*McKerral*) (8).
Kyaukse District : canals irrigate about half total irrigated area bearing crops other than rice ; double cropping, e.g., sesamum before rice (*Stuart*) (242).

NEW CROPS :

Demonstration of, necessary (*Shwe, etc.*) (382).
Meteorological data required (*Jevons*) (266).
Not hopeful (*McKerral*) (8).
Rice, no crops can compete with, in Lower Burma (*Hendry*) (57).
Very little headway (*Pan, etc.*) (197).

OUTTURN :

Paddy, generally 8 baskets per acre 15 years ago and now (*Tun, etc.*) (210) 63176-80. 50 per cent greater with seed from Agricultural Department (213) 63225-40 ; 750 baskets of paddy from 100 acres (*Pan, etc.*) (204) 63151 ; long lived, *Nga-sein-gyi*, successfully introduced by Agricultural Department (*Shwe, etc.*) (391).
Pemyit, leguminous, roots and pods food crop, in irrigated rice areas of Upper Burma (*McKerral*) (8).
Peseinsa, leguminous, root food crop, Lower Burma and alluvial tracts (*McKerral*) (8).

PESTS :

Bollworm, pink, all over Burma ; difficulty because cultivators gin part of their own kapas (*Ghosh*) (337) 64347-57.
External : special protection from Indian Peninsula required (*Ghosh*) (329) 64183-5.
Internal : *Chilo simplex* and borers, palm beetle ; legislation required (*Ghosh*) (329) 64184-7 ; cotton (329) 64188-91 ; Pusa not consulted except occasionally to identify pests (329-30) 64192-7.
Legislation necessary (*Ghosh*) (336) 64319.
Paddy : borer damage avoided by altering time of planting (*Ghosh*) (338) 64369.
————Crabs caught in pots (*Ghosh*) (338) 64369-70.
Propaganda by pamphlets (*Ghosh*) (336) 64316-22.
Protective measures should be taken immediately (*Tun, etc.*) (207).
Pwinbyu (*striga lutea*) damaging jowar fodder ; remedies (*Robertson*) (343).
Research, should be centralised (*Ghosh*) (298), (339) ; (*Tun, etc.*) (205).
Smut on jowar, copper sulphate used (*Robertson*) (340), (348) 64463-6.
Potato cultivation increased in Shan States owing to Scotch seed and extension of railway (*McKerral*) (4), (19) 60967-8, (34) 61210.
Price of paddy : considerable increase (*Tun, etc.*) (210) 63179-80.
Profitable crops : sugarcane, cocoanut, plantain, Indian corn, tobacco, onions, groundnut, gram and betel (*Dun*) (376).

CROPS AND CROP PROTECTION—*contd.*

Protection: insufficient (*Shwe, etc.*) (382), (392).
Rangoon bean, important commercially (*McKerral*) (8).
Rats: do a great deal of damage (*Tun, etc.*) (209) 63173-4.

RICE:

Area under, in Lower Burma, 90 per cent of cultivated area (*Hendry*) (57).
Burma supplies 63 per cent of Western world's requirements; quality not inferior (*McKerral*) (43-4) 61355-8; quantity has increased steadily (*Hendry*) (62) 61613-4.
Diseases: remedy burning stubble (*McKerral*) (38) 61281-3.
Flood resisting varieties (*McKerral*) (55) 61529-31.
Heaviest yielding food crop (*McKerral*) (8).
Improvement: Considerable scope for (*Edwards & Nelson*) (225); breeding farm, work satisfactory; importation from Bangkok successful (228) 63398-401; demand for better quality (229) 63407-8; importance of uniformity; quality is improving; reputation has not risen in the world market; the cheapest rice (229) 63409-16; importance of weight per basket, yield and appearance; not sold for cooking qualities (231-2) 63436-49, (232-3) 63462-5, (234) 63481-4; compulsory use of tested seed (235) 63503-12; satisfactory progress: increased yield and premium (*Hendry*) (57), (65) 61654-5.
Japanese and other short period varieties (*Hendry*) (60) 61592-6.
Ngasein, for export (*Hendry*) (61) 61610.
90 per cent of the whole irrigated area (*Stuart*) (242).
Premiums given on improved variety (*McKerral*) (8); (*Hendry*) (60) 61586-9, (61) 61597-9; but difficulty of marketing (64) 61641-2.
Produced by Agricultural Department, better outturn and prices (*Pan, etc.*) (192); sometimes cultivator does not share in improved price (202) 63092-6.
Quality of Burma rice (*Hendry*) (61-2) 61609-13.
Quality and quantity (*McKerral*) (40) 61304-7.
Red rice, percentage being reduced (*Hendry*) (60) 61590-1.
Seed of Agricultural Department gives uniform crop for which mills pay increased prices (*Dun*) (376); (*McKerral*) (25-6) 61060-9.
Steel Brothers, seed distribution by (*Edwards & Nelson*) (228) 63398, (232-3) 63462-5.
Varieties already in the country should be improved (*Hendry*) (57); hybridisation work (59) 61567, (64) 61643-4.
Varieties under distribution, 7; under study, several hundreds (*Hendry*) (60) 61585.
Yield not decreasing (*McKerral*) (45) 61378-81, (52) 61493-4 (*see under* **MARKETING** *and* **RESEARCH**).
Rubber, introduced during the last 20 years: 79,437 acres (*McKerral*) (8); not much assistance from Agricultural Department (22) 61004-9.
Saccoline millet: has gradually become popular as a fodder crop (*Dun*) (376).

SEED DISTRIBUTION:

Absentee landlordism retards in Pegu (*Maung, etc.*) (176).
By Agricultural Department, no private agency (*Hendry*) (57), (61) 61600-5.
Centre of distribution should be in each village tract (*Tun, etc.*) (207), (209) 63176.
Central seed farms, experimental and not expected to pay (*Hendry*) (65) 61664.
Commercial assistance desirable (*Edwards & Nelson*) (232-3) 63462-5.
Co-operative societies, little success in opening seed farms (*Hendry*) (59) 61572-4.
Cotton: great importance of. At present no system; cultivators buy from ginning factories (*Edwards & Nelson*) (226); control by ginneries (233) 63466-70.
Cultivators' difficulty in getting seed; high prices charged by local ginners; average price Rs. 5 to Rs. 7 early in the season to Rs. 17 later; some seed extremely bad germination; setting up of Government ginneries not advisable; regulations insisting on standard of germination; hand ginning a retrograde step (*Robertson*) (349-50) 64482-96 (*see under* **MARKETING**).
Depôts advocated (*Shwe, etc.*) (391).
District farms rented to tenants (*Hendry*) (65) 61665-8.
Expansion satisfactory (*Hendry*) (57); on a large scale (58-9) 61561-2.
Facilitated by showing cultivators that higher prices are paid for crops grown from pure seed (*Shwe, etc.*) (382).
Farms in each district necessary to save transportation cost (*Hendry*) (57); there are 32 in 6 districts (59) 61563-6, (61) 61606-8.

CROPS AND CROP PROTECTION—*concld.*

SEED DISTRIBUTION—*contd.*

Farms, 25 to 30 acres, required in each village tract (*Tun, etc.*) (205-7); should be self-supporting (219-20) 63310-20.
by Government, not private agency (*McKerral*) (8).
Grain: kinds desired by people should be ascertained (*Maung, etc.*) (169).
Groundnut: cultivator keeps his own seed (*Edwards & Nelson*) (226).
of Paddy seed: partly unsuccessful owing to unsuitability (*Maung, etc.*) (170); help of co-operative societies (181) 62867-8; supplied by Agricultural Department, premium of Rs. 10 per 100 baskets paid (*Gyi, etc.*) (401) 64863-5.
Prices adjusted to equalise transport cost (*Hendry*) (65) 61663.
Quality of seed, legislation not necessary (*Hendry*) (66) 61670-4.
Societies for joint growing of pure seed and selling direct to millers, successful; premia paid by millers for improved paddy (*Pan, etc.*) (191); but floods during last 5 years (192); unsatisfactory; should be distributed from township headquarters and advertised (195), (197).
Sesamum seed, price increased from Rs. 7 to Rs. 17 (*Sein*) (?58) 64571-2.
Snipe, great insect feeders (*Tun, etc.*) (205), (222) 63366.

SUGARCANE:

Horticulturist at Hmawbi Farm in charge (*Hendry*) (63) 61631-3.
Improved furnaces, numbers increasing, but shortage of demonstration staff and small area under sugarcane (*Charlton*) (290) 64058-63.
Prospects good: J-213 and B-3412 (*Hendry*) (63) 61628-30.
Quantity negligible in Southern Circle (*Hendry*) (63) 61628.
Tapioca (cassava), increased area (*McKerral*) (8).
Water: crops could be grown from January to May if water were available (*Hendry*) (65) 61656-62.
Wild animals: damage caused by, comparatively insignificant (*McKerral*) (8); methods of scaring away (*Shwe, etc.*) (391); Township officers should take measures to prevent damage (*Dun*) (376); no damage (*Pan, etc.*) (192).

CULTIVATION.

Agricultural improvement committees, five started (*McKerral*) (42) 61325-7; informal (45) 61390-4.
Breaking of surface before rains not possible (*Shwe, etc.*) (394) 64816-8.
Cotton, difficulty of introducing row-sowing instead of broadcasting (*McKerral*) (9).
Culturable waste: 20 million acres; most would be unprofitable to work (*McKerral*) (48) 61427-35. Rate of increase of area cultivated diminishing (54) 61523-7.
District councils take no interest in agricultural matters (*McKerral*) (45) 61395-6.
Drill sowing recommended (*Robertson*) (342).
Dry tract, extreme uncertainty of season (*Robertson*) (343-4) 64374-85; 30 ins. of rainfall in 6 months; implements used; mixed cultivation: groundnut and pigeon pea, sown broadcast; in proper groundnut tracts no rotation (*Robertson*) (347-8) 64448-58.
Gwin-set plough, a great improvement (*Shwe, etc.*) (390-1).
Improved methods, introduction of, not very successful (*McKerral*) (9).
Instruction needed as to rotations, mixtures, periods of planting, destruction of insect pests (*Shwe, etc.*) (382-3), (391).
Inter-cultivating recommended (*Robertson*) (342).
Kazins, importance of (*Tun, etc.*) (208), (213) 63217-20, (214) 63238-42.
Line sowing recommended (*Robertson*) (342).
Middle tract, shortage of moisture a limiting factor; green manuring (*McKerral*) (20-1) 60973-82.
Outturn: 750 baskets of paddy from 100 acres (*Pan, etc.*) (204) 63151.
Paddy, present method most suitable (*Tun, etc.*) (207).
Plough, hire of, costs 75 baskets of paddy per yoke (*Pan, etc.*) (204) 63150.
Plough cattle (*see* DRAUGHT ANIMALS *under* **ANIMAL HUSBANDRY**).
Rice: present method most suitable (*Tun, etc.*) (207); intensive instead of extensive (*Hendry*) (62) 61615; puddling (64) 61649.
Rotation: none in Insein District, paddy being the only crop (*Pan, etc.*) (192). Propaganda as to, by leaflets, cinema, broadcasting and demonstrations, advocated (197).
Shifting cultivation (*see under* **SOILS**).
Sugarcane, economies can be effected (*McKerral*) (9).
Theikpan plough designed by Agricultural Department, improved tillage if used (*Pan, etc*) (192); recommended (*Robertson*) (342).

CULTIVATION—*contd.*

Tillage: not much done to improve (*Pan, etc.*) (192); very little improvement can be made (197); existing system defective (*Shwe, etc.*) (382), (391).
Tractors: use of, prevented by lack of capital; Government should assist (*Pan, etc.*) (197).
Waste of time through growing unseasonable crops, bad implements, poor seed (*Shwe, etc.*) (378), (383).
Water: crops could be grown from January to May if water were available (*Hendry*) (65) 61656-62.

DAIRYING (*see under* **ANIMAL HUSBANDRY**).

DAN, DANIEL PO, Bar.-at-Law, Tharrawaddy: (237-40). Landowner, letting out land to agriculturists on produce rent, 13 to 15 baskets per acre (238) 63542-8.

AGRICULTURAL DEPARTMENT:

Work, considerable; should be strengthened (240) 63575-9.

AGRICULTURAL INDEBTEDNESS:

Causes of borrowing: need of expenditure before harvest, facile credit, improvidence, crop failure and loss of cattle (237).
Labourers, field, suffer by having to sell their paddy before harvest at a low price (238); have to sacrifice half the price; are hired during the rains for baskets of paddy to be delivered at harvest; would benefit if they could borrow money at reasonable interest (239) 63554-60.
Repayment prevented by the same causes as borrowing (237).

AGRICULTURAL INDUSTRIES:

Basket-making: most people can only do if paid a daily wage (238).
Bee-keeping: almost unknown (238).
Labourers, field, unemployed for 3 months in the rains and 4 months in hot weather (238).
Leisure period: cultivation work from May to January; in slack season from January to May earting, collecting firewood, bamboo, thatching and manuring land; 80 days when very little work (238); no connection between slack season and crime (240) 63570-4.
Poultry rearing: Buddhist religious objection (238), (239) 63549.
Rope-making: most people can do only if paid a daily wage (238).
Sericulture: only in certain localities (238), (239) 63549-50.
Study, intensive, of each rural industry, advocated (238).

AGRICULTURAL LABOUR:

Labourers, field, unemployed period (238).

CROPS AND CROP PROTECTION:

Coffee grows well in Burma (238).
Hmawbi Government Farm distributing many improved varieties (238), (240) 63575-9.

DEMONSTRATION AND PROPAGANDA:

Demonstration of improved implements (238).

EDUCATION:

Agricultural: Institutions, supply insufficient (237).
——— Students, not drawn mainly from agricultural classes (237); taking up cultivation after education (239) 63561-3.
——— Teachers, supply insufficient; if possible, should be drawn from agricultural classes (237).
Attendance in 4th class poor owing to parents employing their children in the house and fields (238).
Compulsion advocated (238), primary vernacular (239-40) 63566-7.
Crime, partly due to lack of education (240) 63567.
Nature study advocated (237).
Pyinmana, at least one school similar to, required (237).
School farms advocated (237).
School plots advocated (237).

DAN, DANIEL PO—*contd.*

FINANCE :

Government loans, great difficulty in obtaining (239) 63564-5.

IMPLEMENTS :

Demonstration in the field advocated (238).
Paddy reaping machine introduced 40 years ago, but heavy and unsuitable (238).
Threshing machine : works perfectly but too heavy (238).

VETERINARY :

Inoculation, often too late (238).
Legislation dealing with notification, segregation, etc., very necessary (238).
Research, further facilities required (238).

WELFARE OF RURAL POPULATION :

Crime, large proportion in Tharrawaddy (239) 63551-3 ; partly due to lack of education (240) 63567 ; no connection with slack season (240) 63570-4.

DAWSON, L., of Dawson's Bank, Ltd., Rangoon (254-63).

AGRICULTURAL INDEBTEDNESS :

Causes of borrowing : rinderpest (255), (257) 63703 ; thriftlessness, festivals, sickness, litigation (255), (259) 63731-2 ; want of banking facilities, high standard of living (255); as compared with India ; probably gone up in recent years (261) 63781-5.
Measures for lightening agriculture's burden of debt : better repayment would lower interest (255).
Repayment prevented by same factors as cause borrowing (255).
Restriction of credit of cultivators, not advocated (255).
Sources of credit : village moneylender, chetty, co-operative credit societies, banks (255).

CAPITAL, ATTRACTING OF, TO AGRICULTURE :

Improvements by landowners discouraged by want of co-operation among landowners and lack of banking facilities (255).
Zamindari system should be recognised by Government in the delta (255), (258) 63707-10.

CO-OPERATION :

Credit societies : not generally in competition with joint stock banks, but complementary (258) 63718-21.
Progress : recent setback (258) 63718.

FINANCE :

Banking facilities : extension of to rural parts advocated (254) ; cheques, use of, growing ; dacoity encourages banking habits (258) 63711.
Chetties : charge 30 per cent interest, but rates decrease in face of competition of joint stock banks (259) 63733-4 ; useful but offend against canons of sound banking (260) 63757-60, (262) 63788-91.
Co-operative credit societies : can give short term credit ; but difficult to finance produce (255) ; not generally in competition with joint stock banks (258) 63718-21.
Dawson's Bank : Report, 1923 (255) ; 7,000 customers ; managers usually lawyers ; not moneylenders ; know the cultivators (256) 63672-6 ; average interest 14¼ per cent (256) 63678-82 ; takes the cream of the security (262) 63788-91 ; has not acquired considerable areas of land by foreclosure ; policy not to hold land (256-7) 63683-93 ; makes short term advances on produce but not on cattle alone ; difficulty that legal right on such produce is very indefinite (257-8) 63701-5, (258-9) 63722-8 ; operating in the lower portion of the delta (259) 63735, (261) 63778-80 ; does not lend money to moneylenders intentionally ; is a joint stock bank, was formerly a private company ; paid-up capital 7½ lakhs, gross assets 90 lakhs, outstanding loans about 57 lakhs ; borrowers mostly substantial landowners (259) 63735-42 ; borrowers usually honest (262) 63786-7 ; land the substantive security ; trouble in investigating title (259-60) 63743-7, (262-3) 63802-4 ; a quarter make default in payment of instalments ;

DAWSON, L—*contd.*

FINANCE—*contd.*

bank retains right to demand payment of the whole loan at any time; Burmans being trained to take part in the business (259-60) 63748-56; 9 branches; considerable room for expansion in the delta, an area of 25,000 square miles; branch managers not prohibited from lending on their own account; control exercised over way borrower spends loan; administration expenses heavy; resort to civil court deprecated (260-1) 63761-77; reluctant to advance money in the districts where cannot control the loans (262) 63792; long term loans not exceeding 10 years (262) 63793-7; mainly agricultural business; have combined ordinary operations of joint stock bank with those of a land mortgage bank; free from "encumbrances" of the commercial banking house which has to deal with city business (262) 63798-801; confusion in the mind of the borrower between short and long term loans must be avoided (263) 63805-7.

Insurance increasing (258) 63712-7.

Joint stock banks: can operate in the delta where crops are secure and land easily marketable (254); can give short term credit (255); must specialise in long term deposits (256) 63666, 63677, (259) 63729-30.

Land in the delta easily realisable (255), (257) 63694-5.

Land mortgage banks: can operate where crops less secure and land not easily marketable, because financed not by deposits but by long term debentures (255), (257) 63698-700, (259) 63729-30.

Long term credit: (255); joint stock banks should provide; careful examination of applications necessary (256) 63666-71; not exceeding 10 years (256) 63679, (262) 63793-7; care taken to see that money is appropriated to purpose for which borrowed (257) 63696-7.

Short term credit: can be given by joint stock and co-operative banks, but difficult to finance produce (255); not exceeding 9 months (256) 63679-80, (257-8) 63701-5.

Taccavi: should be retained but not extended (255).

Title: investigation takes a great deal of time (258) 63706, (260) 63745-7, (262-3) 63802-4.

WELFARE OF RURAL POPULATION:

Standard of living: high, cause of indebtedness (255); high as compared with Indian Peninsula; probably gone up in recent years (261) 63781-5.

DEBT (*see under* **AGRICULTURAL INDEBTEDNESS**).

DEMONSTRATION AND PROPAGANDA.

Agricultural education: propaganda necessary to induce lads to study (*Pan, etc.* (190), (191).

Agricultural improvement committee, none (*Hendry*) (63) 61627.

at Conferences, agricultural and co-operative (*Hendry*) (56).

Copper sulphate, demand for, as anti-smut treatment of jowar, as the result of free demonstration issue (*Robertson*) (340), (348) 64463-6.

in Cultivators' own fields: near villages and roads (*Hendry*) (56); no specific guarantee (62) 61622; comparative demonstrations of improved and mixed seeds (*Pan, etc.*) (191); of fertilisers (192), (197); and improved implements (192); the best method (*McKerral*) (3), (19) 60962; use of Ammo-phos (7); (*Gyi, etc.*) (395); (*Robertson*) (340).

Demonstrations on Department's land, regardless of expenditure, worse than useless (*Pan, etc.*) (195), (200) 63058-9, (205) 63166; (*Jevons*) (265).

Demonstrators, mostly graduates of Poona Agricultural College and have practical knowledge (*McKerral*) (16) 60910-3.

Direct propaganda by Agricultural Department by posters and leaflets distributed in villages, should precede demonstration (*Jevons*) (265).

Distribution of activities, fair, between demonstration and research (*McKerral*) (16) 60914-5.

Distribution of pure seed: to individual cultivators fails owing to mixing; to societies will be successful (*Pan, etc.*) (191), (195).

EXPERT ADVICE:

Cultivators may be induced to adopt (*Pan, etc.*) (195); by best-holding competitions with prizes (*Robertson*) (340); which has been done in Myingyan Circle (344) 64379-81; cultivator willing (345) 64393-5, (348-9) 64474-8; cultivators do not require advice as to existing crops which they grow better than on Government farms (*Ghosh*) (299).

DEMONSTRATION AND PROPAGANDA—*contd.*

FARMS:

Experimental farms in each district (*Ghosh*) (299); 25 to 30 acres, for demonstration required in each village tract (*Tun, etc.*) (205-6); should be self-supporting (219-20) 63310-20.

Government experimental, have little effect (*Robertson*) (340).

for Instructing agriculturists should be opened by the Agricultural Department (*Gyi, etc.*) (396).

Special demonstration, subject to criticism (*McKerral*) (3); but necessary in special circumstances (31) 61161.

Fertilisers, use of: staff insufficient for demonstration (*Hendry*) (58) 61557-60; (*Shwe, etc.*) (382).

Field demonstrations on paddy land (*Maung, etc.*) (170-1); more necessary (176).

Foreign markets: varieties of paddy suitable for, should be made known to agriculturists (*Tun, etc.*) (207).

Gram, substitution of immune variety (*McKerral*) (4).

Groundnut cultivation increased from nothing to over 400,000 acres in 20 years; cotton ginning factories could deal with groundnut (*McKerral*) (4).

Gwin-set revolving harrow should be demonstrated (*Shwe, etc.*) (390).

Hmawbi Farm: excellent for research work but for demonstration serves only 5 miles radius (*Tun, etc.*) (205).

Higginbottom work at Allahabad (*Jevons*) (267) 63818.

Improved implements, necessary (*Maung, etc.*) (176-7); (*Dan*) (238).

Improvements of holdings might be financed by Government (*Robertson*) (340); under existing Acts (344) 64382-5.

Indirect propaganda: of great importance; Universities and Education Department should create an atmosphere of interest in agriculture; patriotism should be aroused; permanent agricultural exhibition required in Rangoon (*Jevons*) (265), (267) 63816-20; Hmawbi Farm inaccessible (274) 63898.

Leaflets, lecture, lantern slides, should follow demonstration on cultivators' fields (*Robertson*) (340).

Lectures should follow demonstration (*Gyi, etc.*) (395); in cultivators' own village (*Hendry*) (56).

Literature, agricultural, non-official, paucity of (*Jevons*) (265); land-owning class largely literate (270) 63851-2.

Manures, natural, demonstration of storing and bedding necessary (*Robertson*) (342)

New crops, demonstration of, necessary (*Shwe, etc.*) (382).

New varieties introduced by Agricultural Department; cultivators have quickly adopted, *e.g.*, hard sugarcane and Karachi gram (*Ghosh*) (299).

Paddy seed, distribution of, partly unsuccessful owing to unsuitability (*Maung, etc.*) (170); great benefit resulting from demonstration of pure seed (176).

Peripatetic lecturing (*McKerral*) (3).

Pests: posters and pamphlets issued (*Ghosh*) (336) 64316-22.

Plots in representative soils for experiment (*Ghosh*) (299).

Potato cultivation increased in Shan States owing to Scotch seed and extension of railway (*McKerral*) (4), (19) 60967-8, (34) 61210.

Ram, Sir Ganga: farming operations in the Punjab (*Jevons*) (267) 63818.

Rice, spread of improved varieties (*McKerral*) (4).

Short courses for cultivators at central farms (*McKerral*) (3).

Shows, cattle or produce (*McKerral*) (3); held every year (17) 60916-7.

Shows, exhibitions, etc. (*Hendry*) (62-3) 61622-7.

STAFF: More junior officers required for village work (*Tun, etc.*) (210-1) 63184-7; trained labourer cultivators should be permanently appointed for demonstration (*Robertson*) (340); in Myingyan Circle (348) 64459-62.

Successes, due to filling market need and giving immediate profit (*McKerral*) (4); (*Dun*) (373).

Successful demonstration: harrow called *arlein*, iron harrow with 5 teeth, seed supplied by Agricultural Department, soaking seeds in diluted vitriol to prevent disease (*Gyi, etc.*) (395); Karachi gram and other seed (396).

Theikpan ploughshares, great demand for, as the result of practical demonstration (*Robertson*) (340).

Touring of agricultural officers (*Hendry*) (59) 61570-1.

DEVELOPMENT COMMISSIONER: now called Financial Commissioner for Transferred Subjects (*McKerral*) (47) 61413-4; to co-ordinate Agricultural, Veterinary

DEVELOPMENT COMMISSIONER—*contd.*

and Co-operative Departments, an awkward arrangement (6); had no control over Education, Public Health or Irrigation (47) 61413-22. Board should be substituted (47) 61423-6.

DIET (*see under* **WELFARE OF RURAL POPULATION**).

DUMONT, J.L.,B.Sc. (Edin.) (witness), *see under* **TUN, U. PAW,** *etc.*

DUN, U AUNG, A.T.M., Rice Miller, Daingtaw, Mandalay: (371-8); mills 1,000 baskets of paddy per day, buys through brokers (377) 64777-81; has been farm superintendent in Agricultural Service (377) 64791-2.

ADMINISTRATION:

Burmans should be employed for expert work (374).
Department for sale and purchase of paddy should be established under Agricultural Department (374).
Transport: roads, inadequate (374).

AGRICULTURAL DEPARTMENT:

Agriculturists Loans Act, should administer (374).
Staff: inadequate (372).

AGRICULTURAL INDEBTEDNESS:

Interest: heavy on subsistence and cultivating loans (373-5).
Legislation to protect cultivators from usury should be enforced after provision has been made for Government loans (375).

ARICULTURAL INDUSTRIES:

Leisure period: 100 days in the year (376), (378) 64804.

CROPS AND CROP PROTECTION:

Gram, Karachi: cultivation of, extending (376).
Profitable crops: sugarcane, cocoanut, plantain, Indian corn, tobacco, onions, groundnut, gram and betel (376).
Rice: Seed of Agricultural Department gives uniform crop for which mills pay increased prices (376).
Saccoline millet: has gradually become popular as a fodder crop (376).
Wild animals, damage by: Township officers should take measures to prevent (376).

DEMONSTRATION AND PROPAGANDA:

Successes obtained (373).

EDUCATION:

Adult: should be encouraged by small experimental farms and exhibitions (372).
Agricultural: demand for, general (371).
Burmese, agricultural education should be in (372).
Careers of students: majority become salary earners (372).
Cinema films advocated (372).
Curricula: Modifications necessary (372).
Nature study (372).
Night schools for children advocated (372).
Progress: Gradual (372).
School farms: need encouragement (372).
School plots: should be extended (372).
Stipends should be given to children of cultivators (372).
Students: from Agricultural classes, not available (372).
————Land should be given to students' societies (371-2).
————Number insufficient (371).
Teachers: Agricultural classes, teachers from, not available (371).
————sufficient number (371).

FERTILISERS:

Artificial: Good, but do not sufficiently increase yield to cover expenses (376).
Ashes of paddy husks, good (376).
Cowdung, shortage of, (376); not used as a fuel except by Indians (376).
Demonstration, comparative, on cultivators' own land, advocated (376).
Mixtures of bonemeal and cowdung, advantageous (375).

DUN, U AUNG—*contd.*

FINANCE :

Agriculturists Loans Act : should be administered by Agricultural Department (374).
Government loans to cultivators at moderate interest advocated (374).
Land mortgage banks advocated (373).

HOLDINGS :

Consolidation : difficulty of Government action ; no action should be taken (375).
Legislation necessary to deal with minors, widows and persons legally incapable, and to keep disputes out of the courts (375).

IRRIGATION :

Paddy : continuous water supply essential (374-5).

MARKETING :

Basket for measuring paddy is gradually becoming standardised (377) 64782-7 ; varying size does not lead to cultivator getting less than he ought to (377) 64795.
Brokers : Receive Rs. 2 on 100 baskets of paddy (377) 64788 ; favour sellers from whom they receive brokerage in preference to buyers (378) 64800-3.
Middlemen : store paddy from various cultivators and mix it (377) 64796-7.
Open market : under present circumstances impossible (377-8) 64798-9.
Premium price for quality rice : importance of cultivator receiving, to encourage him to grow better qualities (377) 64793-4.

DUNN, C. W., C.I.E., I.C.S., Officiating Financial Commissioner (Transferred Subjects), Burma ; (66-104). Co-operative experience (72) 61706-9.

ADMINISTRATION :

Circle Boards, elect members of district council ; no other function unless delegated by the district council (97) 61911-2.
Co-ordination of work of departments not completely successful (77-8) 61745-50 ; alternatives of single control or control by a board (95) 61899-901.
Development Commissioner : succeeded by Financial Commissioner (Transferred Subjects) (70) 61681-2.
——————— Co-ordination of departments not a complete success (77) 61745-6.
District councils, areas too large for representation (76) 61742-4.
Ferry tolls, an oppressive tax (88) 61842.
Fisheries inland, appointment of special officer (74) 61727-31, (104) 62004.
Local self-government in rural parts should be developed (70) ; hardly any yet (76) 61742, (87) 61835.
Lorries, great number in rural areas (88) 61841.
Rice control, profits spent on railways and expenditure on road expansion contemplated (99-100) 61954-7.
Roads : Expenditure on (99) 61943-53.
——— Profits of rice control being spent on road expansion (99-100) 61954-7.
Superior Provincial Agricultural Service : rules being framed (78) 61751-7.
Veterinary Department should be under Director of Agriculture (67), (70-1) 61695-8.
Village committee : proportion of literates, powers as assessors in criminal courts (97) 61914-9.

AGRICULTURAL DEPARTMENT :

Superior Provincial Agricultural Service, rules being framed (78) 61751-7.

AGRICULTURAL INDEBTEDNESS :

Ancestral indebtedness not serious (81) 61784.
Bhamado : interest, charged by middlemen (93) 61877.
Causes of borrowing (67) ; productive and unproductive borrowing, difficulty of defining (70-1) 61685-6.

DUNN, C. W.—*contd.*

AGRICULTURAL INDEBTEDNESS—*contd.*

Civil Procedure Code, provisions for protection of cultivators from harassment by cultivators, a dead letter (67); ignored by Courts (81) 61785-8.
Competition among chetties prevents enslavement of borrowers (91) 61864, (93) 61875.
Greatest in richest parts (90-1) 61863-6.
Imprisonment for debt should be abolished (87) 61827-31.
Interest rates of chetties decreasing (73-4) 61726; but middlemen increase the rates of interest (93) 61877.
Legislation to restrict or control credit of cultivators inadvisable (67).
Limitation of accumulated interest to an amount equal to principal (93) 61878-80.
Moneylenders not wicked (93) 61876.
Repayment prevented by inefficiency of lender and borrower (67); chetties do not want to foreclose (71) 61689-92.
Sources of credit (67).

AGRICULTURAL INDUSTRIES:

Buddhist religion, an obstacle (68).
Carting by agricultural labourers in industrialised areas of agriculture not affected by competition of railways and motor cars (88) 61838-41.
Cottage industries dependent upon local supply of material (68).
Cotton ginneries employ rural labour (68).
Factories, establishment of, in rural areas, promising; Government should encourage (68).
Fisheries, inland, appointment of special officer (74) 61727-31; clash of interests of fishermen and agriculturists (104) 62004.
Government can do little (68).
Health conditions of villages: district health officers under district council, etc. (68).
Leisure period varies; many fully occupied all the year (68), (79) 61766-9.
Preparation of agricultural produce for consumption: remarkable progress without Government aid (68).
Rice mills employ rural labour (68).
Standard of life apparently not improved by cottage industries (68).

AGRICULTURAL LABOUR:

Colonisation Department, now Government Estate Department:
———————, should consider recruiting colonists from congested areas (68).
———————, Recruitment attempted (68).
———————, Successful colonies at Minbu and Sittang (93-5) 61883-91.
Efficiency of Burman labour as compared with Indian and British labour (97-8) 61926-40.
Labouring population with little land being created while average size of holdings is increasing; legislation to prevent this would be ineffective without co-operative organisation of the smallholder (91-2) 61867-70.
Migration: seasonal, well developed (68).
———————— Government and co-operative societies probably cannot control (68).

BURMA VILLAGE ACT:

Probably desirable to relax Police restrictions compelling people to live in the villages (96) 61908.

CAPITAL, ATTRACTING OF, TO AGRICULTURE:

Land tenure, restricting alienation, discourages investment of capital (96) 61906.
Price of rice relatively lower than before the War (69); but absolutely higher (96) 61905.
Profits of agriculture must be increased (69).

CO-OPERATION:

Buddhist monks started societies, unregistered, in some cases successful (88) 61836-7, (89) 61853-7.
Canals and embankments, difficulty of organising to maintain, when unanimous consent necessary (69), (80) 61770-1.

DUNN, C. W.—*contd.*

CO-OPERATION—*contd.*

Cattle insurance, failure of (75-6) 61732-5.
Continuity of department broken (73) 61719; very bad (73) 61723, (88-9) 61843-52; superior officers not regular departmental officers (102) 61981-9.
Dry zone districts, failure of societies (82) 61791.
Education in principles of (72) 61712-4.
Godowns: receipts for produce could be used for credit purposes (70) 61683.
Government Estate Department's colonies (93-5) 61883-91.
Government should not provide money (69).
Guaranteeing unions functioning badly (83) 61793-8.
Initiative, lack of, in societies (69).
Interest rates of chetties decreasing (73-4) 61726.
Liquidation: 500 societies (73) 61717-8; policy as to winding up (89-90) 61858-60.
Minority should be compelled to come into schemes for joint improvement; restrictions in Burma Rural Self-Government Act, 1921, should be removed (69).
Non-official agencies, failure of (69), (82) 61791, (95) 61896-8.
Political agitation against Government societies (89) 61853-7.
Primary societies have not been neglected in favour of central societies (82-3) 61792.
Progress, none (69); owing to excessive dependence on Provincial Banks (69); promising in the earlier stages (72) 61709-11, (73) 61715-6; very bad state of things (73) 61723.
Provincial Co-operative Council, in a faint condition (95) 61897-8.
Registrars, frequent change (73) 61719-22, (82) 61790, (95) 61892.
Selling societies should be developed (73) 61724-5.
Statistics as to progress of societies (81) 61777-83.
Training and recruitment of subordinate staff (95) 61893-5.
in Upper Burma, should not be abandoned (82) 61789.
Women, partly control spending of family income, are not excluded from co-operative societies (86-7) 61821-6.

EDUCATION:

Buildings and equipment should be improved (69).
Pay of teachers should be improved (69).
Specialist agricultural instruction inadvisable (69).

FERTILISERS:

Compensation should be given to evicted tenants for unexhausted improvements (87) 61832-4.

FINANCE:

Account keeping, knowledge of, required (66).
Agriculturists Loans Act: loans for the year 1925-6, 12 lakhs; has a moderating influence on interest rates of private moneylenders (103) 62000-3.
Banking knowledge necessary (66), (70) 61683, (71) 61687-8.
Burma Central Bank (93) 61881.
Co-operative godowns, receipts for produce being used for credit (70) 61683.
Egyptian experience of confusion of short and long term loans (76) 61737-9.
General improvement required (66).
Government cannot do much (66).
Land Mortgage Bank: draft Bill (76) 61736; elaborate, cultivator might not understand extent of his liability (85-6) 61804-12; independence of management (86) 61813-20; co-operative element should be introduced, with a nominated board (100-1) 61958-71; a demand for (102) 61990-2.
Long term, danger of confusion with short term (76) 61737-41.
Machinery for issuing loans required (102) 61990-2.
Registration of title of immoveable property (66).
Short term credit: use of agricultural produce as security for, needs improvement (66), (70) 61683-4.
——————Period of crop, 8 months, or for cattle 3 years (80) 61772-6.
Taccavi loans in colonies of Government Estates Department (94) 61883.
Torrens system, doubtful (66); suitable to Australian conditions which are different from Indian (96) 61909-10.

DUNN, C. W.—*concld.*

HOLDINGS:

"Agriculturists", definition of (95-6) 61902-4.
Economic holding: 9 acres in North Prome, 22 acres in South Tharrawaddy (78-9) 61758-9.
Fragmentation not excessive (67), (78-9) 61758-65.
Price of land follows price of paddy (96) 61905.
Size of holding varies; average figure over a wide area useless (84) 61802-3.
Transfer by sale, 497,000 acres in 1925-6 in Lower Burma (96) 61905.

IRRIGATION:

Canals and embankments, construction and maintenance of by district councils under Burma Self-Government Act, 1921, requires unanimous consent (69), (80) 61770-1.

LAND REVENUE:

Pitch of assessment (101) 61971-80.

LAND TENURE:

Government Estates Department, a model landlord, land leased to tenants (94) 61883-8.
Yearly tenancy system, discourages use of manure (87) 61832-4, (96) 61906-7, (103) 61997-9.

STATISTICS:

Progress of co-operative societies (81) 61777-83.

TARIFFS AND SEA FREIGHTS:

Export duties on rice and hides injurious to cultivators (69).
Hides, export has decreased owing to export tax (69), (72) 61701-5.
Import duties injurious to cultivators (69), (72) 61699-700.

VETERINARY:

Department: should be under Director of Agriculture (67), (70-1) 61695-8.
————Very strong in numbers (103) 61996.
Dispensaries: no demand for increased number (67).
————Only four; district councils contribute to but do not control (67).
————Prome district council has objected to paying for (67).
————Provincial authority, control should not be transferred to (67).
no Popular demand for expansion of service (103) 61993-5.
Superior Veterinary Officer with the Government of India, appointment of, not recommended (67).

WELFARE OF RURAL POPULATION:

Crime, great increase (97) 61924-5.
Diet, rise in standard of (99) 61941-2.
Economic surveys in typical villages generally not advisable (70), (83) 61799-801.
Efficiency of Burman labour compared with that of Indian and British (97) 61926-33.
Government Estates Department colonies (94) 61883-91.
Housing: vast increase in masonry buildings; use of corrugated iron (97) 61922.
Malaria and other diseases handicapping Burman cultivator (98) 61934-40.
Self-government, rural local, should be developed (70).
Standard of living has risen (97) 61920-3.

EDUCATION.

Administration: should rest with school committees and teachers under control of Government which should give grants-in-aid (*Shwe, etc.*) (390).

EDUCATION—*contd.*

ADULT, IN RURAL TRACTS :

Christian Missions Village Education Committee, 1920, work on similar lines advocated (*Bulkeley*) (134).
Cost (*McKerral*) (31) 61157-60, (33) 61203-7.
Cultivators at Agricultural Department central farms (*McKerral*) (2), (18) 60946-53, (19) 60959-61.
Demand for, has not expressed itself (*Bulkeley*) (136) 62504.
——— should be encouraged by Government giving preference to educated persons (*Shwe, etc.*) (379), (390); by small experimental farms and exhibitions (*Dun*) (372).
Establishment of national form of Government, must probably wait for, or until district councils have sufficient enlightenment and funds (*Bulkeley*) (135), (142) 62575; comparison with England and Punjab (143) 62580-3.
Farm schools and continuation schools: teaching 9 months, touring and demonstrating 3 months, suggestion (*McKerral*) (3), (12).
Libraries necessary (*Maung, etc.*) (170); co-operative societies should help (181) 62869-70.
Magic lantern lectures, cinema (*Bulkeley*) (134).
Night classes necessary (*Ghosh*), (299), (332) 64235-40.
should be Popularised by demonstration that profits are increased by improved methods (*Pan, etc.*) (191).
Stipends of Rs. 20 per month (*McKerral*) (36) 61238-40.
Students: go back to the land; some the scum of the village (*McKerral*) (40) 61308-12.
Voluntary agencies, lack of (*Bulkeley*) (134); political feeling an obstacle compared with Madras (142-3) 62576-9.

AGRICULTURAL :

Agricultural classes, teachers should be drawn from (*Shwe, etc.*) (378), (390).
in Burma generally considered to be a subject of secondary importance (*Charlton*) (297) 64169-70.
should be a Compulsory subject in schools (*Shwe, etc.*) (386-7).
Demand for, general (*Dun*) (371).
Economics, agricultural, taught at Mandalay College as part of the agricultural course (*Charlton*) (296) 64167.
small scope for Employment of educated persons (*Tun, etc.*) (217) 63288-91.
Extension, urgent need for (*Shwe, etc.*) (378), (390).
High School Final examination: increasing number of students offering agriculture (*Charlton*) (279), (289) 64046-50.
Importance of (*McKerral*) (29) 61131-2.
Incentive to study agriculture: Government service (*Charlton*) (280).
Institutions: supply insufficient (*Dan*) (237); (*Pan, etc.*) (190).
Local control necessary (*Tun, etc.*) (214-6) 63248-70.
Primary, a crying need (*Tun, etc.*) (214) 63248-54.
Scientific, should be a subject in village lay schools (*Sein*) (353); should be taught in all educational institutions (*Maung, etc.*) (170); schools should be established in every important agricultural district (175).
Students, not drawn mainly from agricultural classes (*Dan*) (237); taking up cultivation after education (239) 63561-3; are mainly drawn from agricultural classes (*Shwe, etc.*) (379).
Teachers, supply insufficient; if possible should be drawn from agricultural classes (*Dan*) (237); (*Shwe, etc.*) (378), (390).
Teaching should be in Burmese (*Dun*) (372).
Text books, elementary, cause laughter (*Ghosh*) (298); agriculture should not be taught in elementary schools (331) 64215-23.
Value educational rather than vocational (*McKerral*) (54) 61516-8.
No institutions for, in the districts (*Pan, etc.*) (190); boys of agricultural classes only have time to learn to read and write (191); should form part of rural education (191); should be left to Agricultural Department and financed by Government (191); schools, urgent need for (195); boys should attend at about 15 years of age (200) 63052-7; existing system bad (199), (201) 63068-70.

AGRICULTURAL BIAS :

Agricultural bias: in rural areas, advocated (*Pan, etc.*) (194).
——— will not lead to much improvement (*Bulkeley*) (135); but more might be done in this direction; better trained teachers required (*Bulkeley*) (139) 62538-40.

EDUCATION—*contd.*

AGRICULTURAL BIAS—*contd.*

Agricultural Department's short courses for adolescent (*Bulkeley*) (144) 62594-5.
Agricultural research and demonstration station required in immediate vicinity of Rangoon (*Jevons*) (265); Hmawbi Farm inaccessible (274) 63898.
Arithmetic, Burmese have average ability for (*Bulkeley*) (138) 62523-4.

ATTENDANCE AT SCHOOLS:

Money wasted owing to children leaving school prematurely (*Bulkeley*) (135); this the chief reason of failure (139) 62536-7; compulsion necessary to stop this waste (146) 62615-6; suffers from lack of employment for educated persons (*Maung, etc.*) (170); in 4th class poor owing to parents employing their children in the house and fields (*Dan*) (238); (*Sein*) (353); adversely affected by lack of practical agricultural value of teaching (*Pan, etc.*) (194); due to parents' lack of desire for education and requiring their children to work (*Shwe, etc.*) (387), (393).
Books, in the vernacular, not ideal, but quite useful (*Bulkeley*) (139) 62536-7; Text Book committee (141) 62563.
Buddhist monastery schools, teaching meagre (*McKerral*) (3).
Buildings and equipment should be improved (*Dunn*) (69).
Careers of agricultural students: majority become paid servants (*Shwe, etc.*) (379); (*Dun*) (372); students, higher or collegiate, should be compelled to serve in Agricultural Department and be trained in Agriculture before going to other departments (*Shwe, etc.*) (386).
Cinema films advocated (*Dun*) (372).

COMPULSORY EDUCATION:

The only cure, but can only be gradual and should be accompanied by levy of an education rate (*Bulkeley*) (135); compulsion Act contemplated (137) 62513; Education cess (142) 62570-3; difficulty with regard to monastery schools (143-4) 62584-8, (146) 62615-6; advocated (*Dan*) (238); primary vernacular (239-40) 63566-7; advocated in suitable places (*Shwe, etc.*) (393); advocated, conditionally (*Pan, etc.*) (203) 63121-5; preferred in rural areas (*Sein*) (353); would not involve extra expenditure (*Sein*) (362) 64637-8, (364) 64670-6.

CO-OPERATION:

Training schools should be opened at the expense of Government (*Maung, etc.*) (177); should be a subject in village lay schools (*Sein*) (353).
Crime, partly due to lack of education (*Dan*) (240) 63567.
Curricula: Modifications necessary (*Dun*) (372).
Demand for agricultural education should be stimulated by use of Burmese language and proving economic advantage (*Pan, etc.*) (195).
District councils, transfer of control to, has been successful in every way except financially (*Bulkeley*) (142) 62574.
Economics: Professors should lay stress on importance of agriculture (*Jevons*) (265); agricultural economics a compulsory subject in Rangoon University (273-4) 63887-95.
Elementary: standard too low to benefit cultivators appreciably (*Pan, etc.*) (194).
Elementary school: Parents unable to keep children at school continuously owing to needing their labour (*Gyi, etc.*) (399).

ENGLISH:

Great demand to learn (*Bulkeley*) (136-7) 62504-8; knowledge of, leads to dislike of manual labour (147) 62621-4; education in, wanted if not expensive (*Pan, etc.*) (203) 63125-30.
Estate managers, no demand for (*McKerral*) (23) 61015-6.
Expenditure in 5 years, 1922-7, increased from 116 to 193 lakhs, figures (*Bulkeley*) (139-140) 62541-4.
Facilities, insufficient (*Shwe, etc.*) (393).
Fees, none should be charged for children at school (*Maung, etc.*) (170).
Garden cultivation should be taught in schools (*Shwe, etc.*) (379).
Government action suspect for political reasons (*Bulkeley*) (142) 62575; comparison with England and the Punjab (143) 62580-3.
Handicrafts: should be taught in schools (*Shwe, etc.*) (379); schools should be opened (*Gyi, etc.*) (399).

EDUCATION—*contd.*

Higher: not needed by agriculturists (*Pan, etc.*) (194).
Hygiene, importance of (*Jolly*) (165-6) 62787-94.
Incentive, Government service (*Bulkeley*) (134-5); (*McKerral*) (3), (19) 60954-5. Government to some extent responsible for this materialist view (*Bulkeley*) (141) 62564-6, (145-6) 62606-8.
Insein Veterinary College: (*see under* **VETERINARY**).
Inspection of schools, insufficient staff; standard has been lowered while awaiting Superior Provincial Service (*Bulkeley*) (141) 62555-63.
Institutions, insufficient (*Maung, etc.*) (169).
Libraries, need of (*Bulkeley*) (134); Government should start (142) 62575, (145) 62601-5.
Literacy: desirable that it should accompany but need not necessarily precede improvement in standard of life (*Jevons*) (268) 63829; considerable among land-owning class (270) 63851-2.
Literature, agricultural, non-official; paucity of (*Jevons*) (265), (270) 63851-2.

MANDALAY AGRICULTURAL COLLEGE AND RESEARCH INSTITUTE:

Sufficient for Agricultural education (*Pan, etc.*) (190); insufficient, a white elephant (195); schools more necessary (200) 63048-54.
College Council: deals with questions as to teaching and programme of studies (*Charlton*) (290); consists of Principal and heads of all teaching sections; meets when necessary; relation to research, etc. (*McKerral*) (43) 61349-53; (*Charlton*) (292) 64084-8; Director of Agriculture is the immediate superior of the Principal (290) 64067.
Cost of teaching (*Charlton*) (282-3); 41 students costing Rs. 80,000 per annum (293) 64110-2.
Diploma might be held equivalent to B. A. and B. Sc. of Rangoon University as qualification for teaching in Government high schools (*Charlton*) (279).
Economics, agricultural, taught (*McKerral*) (44) 61361.
Personnel (*McKerral*) (16) 60905, (17) 60918-9.
Research: Danger of College becoming partly an arts college; research work should be concentrated as far as possible in the College (*Charlton*) (290-1) 64068-74.

STUDENTS: (*see under* **CHARLTON, J., M.Sc., F.I.C., I.A.S.**)

Mainly training for Agricultural Department (*McKerral*) (2).
No Post-graduate training (*McKerral*) (23) 61019-21, (44) 61371.
Very few sons of cultivators (*Gyi, etc.*) (400) 64840-1.
University affiliation difficulties (*McKerral*) (53) 61511-4; (*Charlton*) (281-2), (285-6) 63981-4, (291) 64075-81, (292) 64089-94; Principal not a Member of Senate of Rangoon University (293-4) 64118-32, (295) 64141-3.
Manual labour, education may cause a dislike for (*Bulkeley*) (147) 62621-4.
Marketing: education the method of improving conditions (*Hendry*) (58) 61555; (*McKerral*) (28) 61119-20.
Mechanics, no demand for tuition (*McKerral*) (19) 60963.

MIDDLE CLASS YOUTHS:

Demonstrations in the field necessary to show advantages of studying agriculture (*Pan, etc.*) (191); should be enabled to develop waste land, with financial aid if necessary (195); should be attracted to agriculture by education (*Shwe, etc.*) (379); by lease of waste jungle land free of revenue (390); training and then practical work; education of, will not solve problem of mass of cultivators (*Ghosh*) (298-9), (337) 64336-42, (338) 64363-4.
Moga system (*Bulkeley*) (141-2) 62567-9.
Monastery schools: majority of population attain literacy in unrecognised schools; do not accept girls (*Bulkeley*) (136) 62500-1; possibilities of improvement doubtful (137) 62509-12; difficulty in connection with compulsory education; a considerable number receive aid from Government; numbers of students; discipline spasmodic (143-4) 62584-92.

NATURE STUDY:

Useful in developing intelligence, but not of direct vocational value (*McKerral*) (3); work not well done (19) 60956-8; urgent necessity, especially of insect life; training teachers the first necessity (*Ghosh*) (298), (332) 64227-34; should be practical (*Pan, etc.*) (191); advocated in all schools (195); advocated (*Shwe, etc.*), (379); (*Dan*) (237); (*Dun*) (372); not agricultural education but general

EDUCATION—*contd.*

NATURE STUDY—*contd.*

education; unpopular as not assisting students to pass examinations; propaganda, etc., necessary (*Bulkeley*) (134); Punjab system not suitable for Burma; definite vocational training should not be introduced in normal schools; Government has refused financial aid (137-8) 62514-20; boys and girls equally interested in (138) 62525-6.

Newspapers: recent considerable increase in circulation of vernacular (*Bulkeley*) (136) 62502.

Night schools: necessary for adults and boys (*Ghosh*) (299); Maymyo adult school (332) 64235-40; advocated for children (*Dun*) (372).

Pay of teachers should be improved (*Dunn*) (69).

Physical exercises should be taught (*Shwe, etc.*) (384).

Poor children should be educated as boarders at school, their expenses being paid (*Shwe, etc.*) (379).

Practical work, as much as possible should be introduced in connection with nature study, school plots and farms (*Pan, etc.*) (191); (*Shwe, etc.*) (390).

Primary: general desire for (*Bulkeley*) (135) 62497-8; suggestions welcomed; majority of schools have more than one teacher; average number of students (140) 62550-3; difficulty with regard to monastery schools (143) 62584-8.

Progress: gradual (*Dun*) (372).

"Project" methods will help (*Bulkeley*) (135); Moga (141-2) 62567-9.

Propaganda necessary to induce youths to study agriculture (*Pan, etc.*) (190).

Punjab system of agricultural training schools not suitable to Burma (*Bulkeley*) (137) 62514-6; because so few middle schools large enough to have farms attached to them (144) 62593, (146) 62609-14.

Pupils: drawn mainly from agricultural classes those who have studied agriculture are employed in the Agricultural Department; none carry on agriculture on their own account (*Maung, etc.*) (170).

Pusa Research Institute should give post-graduate training (*McKerral*) (44) 61371-3.

PYINMANA MIDDLE SCHOOL:

of American Baptist Mission, subsidised by Government: at present an experiment (*McKerral*) (2), (51) 61480-4; no other agricultural school (54) 61515; still in an experimental stage (*Charlton*) (284) 63956-7; well attended by sons of cultivators, between 50 and 60 students, an expensive School (294-5) 64133-40; at least one school similar to, required (*Dan*) (237).

RANGOON UNIVERSITY:

no Co-ordination with Mandalay Agricultural College, which is not affiliated (*Charlton*) (281-2); of which Principal not a Member of Senate (293) 64118-20, (284) 63948-51, (289) 64032-7; teaching of sciences relating to agriculture (290) 64068-9; consists of three Colleges: University College and Judson College in Rangoon and Intermediate College, Mandalay (294) 64123-4; teaches rural and agricultural economics (*Jevons*) (265), (273-4) 63887-95; willing to co-operate with proposed Board of Economic Enquiry (274) 63896-7.

Recreations for lads should be arranged (*Shwe, etc.*) (390).

Research, not assisted by association with elementary teaching (*Charlton*) (285) 63964-5.

Rural, should consist mainly of the three R's (*Pan, etc.*) (199).

Secondary: facilities for, should exist in rural areas (*Pan, etc.*) (194).

Schools: bad; curriculum not much to blame (*Bulkeley*) (135). (*See* CHILDREN *under* **WELFARE OF RURAL POPULATION**).

SCHOOL FARMS:

Advocated (*Shwe, etc.*) (379); (*Dan*) (237); need encouragement (*Dun*) (372); should be practical (*Pan, etc.*) (191); advocated in all schools (195); combine general and vocational education which is seldom successful; would be costly and unpopular (*Bulkeley*) (134), (145) 62596-600; expensive and useless (*McKerral*) (3).

SCHOOL PLOTS:

Advocated (*Dan*) (237); (*Shwe, etc.*) (379); useful in developing intelligence but not of direct vocational value (*McKerral*) (3); should be practical (*Pan, etc.*)

EDUCATION—*contd.*

SCHOOL PLOTS—*contd.*

(191)& advocated in all schools (195); should be extended (*Dun*) (372); (*Maung, etc.*) (170); not necessary in rural areas (*Ghosh*) (298), (331) 64224-6.
Specialist agricultural instruction inadvisable (*Dunn*) (69).
Stipends should be given to children of cultivators (*Dun*) (372).

STUDENTS:

Comparatively few sons of cultivators (*Charlton*) (280).
Land should be given to students' societies (*Dun*) (371-2).
Majority who have studied agriculture are serving in Agricultural Department (*Pan, etc.*) (191).
Not critical of teaching (*Jevons*) (271) 63860-2; do not desire to study agriculture (274) 63902.
Number insufficient (*Dun*) (371).
Subsidy of schools by Government (*McKerral*) (51) 61480-4.
TAX, educational, should be levied locally and paid to teacher, not as regular salary but by way of rewards (*Maung, etc.*) (170).
Technical: scholarships abroad, with the object of furthering industrial development (*Jevons*) (275-6) 63912-6.

TEACHERS:

of Agriculture, should preferably be drawn from agricultural class (*Charlton*) (297) 64172-5.
Agricultural classes, need of (*Ghosh*) (298); for teaching nature study (332) 64227-34; teachers from, not available (*Dun*) (371).
Pay has been recently greatly improved (135): figures (*Bulkeley*) (140) 62544-7. Training doubtful (135). Large number of qualified women teachers (138) 62528. Better trained teachers required (139) 62538-40; Standard of training has not been raised with increased pay (140) 62554; Women paid the same as men (146-7) 62617-20.
in Rural areas, should be drawn from agricultural classes (*Pan, etc.*) (190).
Sufficient number (*Dun*) (371).
Supply, insufficient; should have knowledge of co-operative account-keeping and science of agriculture (*Maung, etc.*) (169); should not receive a regular salary but should receive rewards (170).
Teaching facilities, agricultural, urgent need for extension (*Charlton*) (279); (*Pan, etc.*) (190); difficulty of getting competent teachers (*Charlton*) (295) 64138-40.
University: questionable whether it should confine itself to purely theoretical work or should interfere in applied work (*Charlton*) (284) 63955; specialisation should be preceded by a good basis in pure science (286) 63987-96.
Vocational training, definite, should not be introduced in ordinary schools (*Bulkeley*) (137) 62514-6. Objection not so strong against agricultural as against industrial vocational training (145) 62596-600, (146) 62609-14.

WOMEN:

Not so well educated as men but more advanced than in India (*Bulkeley*) (136) 62499. Monastery schools will not accept girls. Illiteracy of mothers encourages relapse into illiteracy of children (136) 62500-3. Boys and girls equally interested in gardening. Provision of separate schools for girls after a certain age would keep them longer at school. Large number of qualified women teachers. Financial difficulties. Classification as between boys and girls schools misleading (138-9) 62525-35. Difficulty of sending women teachers to lonely villages; should be recruited locally (140) 62548-9. Women teachers paid the same as men (146-7) 62617-20.

EDWARDS, E. L. *and* **NELSON, J. J.**, of Messrs. Steel Brothers & Co., Ltd., Rangoon (224-37).

AGRICULTURAL INDEBTEDNESS:

Cotton: loans on growing crops (225-6).

CO-OPERATION:

Societies for storage and sale of rice (236) 63518-22.

EDWARDS, E. L. *and* NELSON, J. J.—*contd.*

CROPS AND CROP PROTECTION :

Cotton : not much scope for improvement ; conditions in Upper Burma very poor (229) 63417-20 ; picked October and November (232) 63452-3.
Groundnuts : improvement of variety, scope for (230) 63429 ; Agricultural Department working on right lines but staff inadequate (231) 63437-9.
Rice : Considerable scope for improvement (225) ; breeding farm, work satisfactory ; importation of seed from Bangkok successful (228) 63398-401 ; demand for better quality (229) 63407-8 ; importance of uniformity ; quality is improving ; reputation has not risen in the world market ; the cheapest rice (229) 63409-16 ; importance of weight per basket, yield and appearance ; not sold for cooking qualities (231-2) 63436-49, (232-3) 63462-5, (234) 63481-4 ; compulsory use of tested seed (235) 63503-12.
Seed, pure, distribution : Commercial assistance desirable (232-3) 63462-5.
——— Cotton, great importance of ; at present no system ; cultivators buy from ginning factories (226) ; control by ginneries (233) 63466-70.
——— Groundnut : cultivator keeps his own seed (226).
——— Rice : Steel Brothers, distribution by (228) 63398, (232-3) 63462-5.

IRRIGATION :
Cotton : scope for doubtful (230) 63421-2.

MARKETING :
Cotton : Adulteration : leaf, particularly if showers during harvest ; not much dust (232) 63454-5.
——— Credit given on growing crop (225).
——— Export : mainly to Japan, but some to Liverpool and Calcutta (232) 63450.
——— Improvement of variety : not much scope for (229) 63417-20 ; quality between Bengals and Oomras (232) 63451, (233) 63474-6.
——— Ginning factories buy through brokers from jungle traders (225).
——— Jungle traders usually agents for ginning factories ; if independent, often resort to malpractices (225-6).
——— Mixing (233) 63471-3.
——— Open markets, unsuccessful attempt to establish in Upper Burma (230) 63423-5.
——— Season : October-November picking (232) 63452-3.
——— Seed, pure, distribution : no organised system ; cultivators buy from ginning factories : unsatisfactory (226) ; commercial assistance should be given to Government department (232-3) 63462-4 ; control by ginneries (233) 63466-70.
——— Weights and Measures : in villages stone weights which vary slightly (226).
Groundnut : Basket : standard of measure (230) 63430.
——— Central marketing more than with kapas ; very small portion purchased in the jungle by brokers (226).
——— Committee should be set up representing dealers and millers, Agricultural Department, distributors, to teach cultivators need of market and regulate practice (228) 63395-7, (231) 63436.
——— Crop reports, inaccuracy of (227), (228-9) 63402-4, (236-7) 63531-41.
——— Growing crop sold at low price (226).
——— Improvement of variety ; scope for (230) 63429.
——— Magwe market, description by Government officials of unfair treatment of cultivators, inaccurate (230-1) 63430.
——— Oil used for ghi (230) 63428.
——— Open markets advocated (231) 63431.
——— Seed : cultivator keeps his own (226).
——— Supply and demand : competition among buyers for local consumption very keen ; demand greater than supply (226), (230) 63426-7.
——— Unhusked when marketed (226) ; recent development, small crop not exported (230) 63426-7.
——— Weights and Measures : sale should be by weight (231) 63430-2 ; weighment by neutral tallymen not practical (231) 63433.
Rice : Adulteration, common (225).
—— Basket : in the jungle much larger than at the mills (224-5), (227) 63378, (228) 63387-94.
—— Bran : exported to England and Germany (235) 63500-1 ; export cess would not affect price in Burma (235) 63502.
——— Brokers at Rangoon are also traders (224).

EDWARDS, E. L. *and* NELSON, J. J.—*concld.*

MARKETING—*contd.*

RICE—*contd.*

——•— Cess, export, not adversely affecting competition with other producing countries (235) 63498-9.

——— Committee should be set up representing dealers and millers, Agricultural Department, distributors and cultivators, to teach cultivator needs of the market and regulate practice (228) 63395-7.

——— Direct sale by cultivators to mills encouraged (236) 63518-9.

——— Elevators: cannot be used for rice but can for paddy (229) 63405-6.

——— Export: principally to Germany and Holland (234) 63492-3; for starch for industrial purposes (236) 63523-8.

——— Facilities satisfactory (224).

——— Improvement of strain (*see under* **CROPS AND CROP PROTECTION**).

———Jungle brokers paid a commission of Re. 1 to Rs. 2 per hundred baskets of paddy (224).

———Mixing of different grades (227-8) 63386; importance of uniformity (229) 63409, (231) 63440-1; gets mixed on the way from field to mill (235) 63513-7.

———Over-production, possibility of (234) 63492-7.

———Premia paid for selected white grain, especially from seed supplied by Agricultural Department (225); do not always reach cultivators (227) 63379-86; Rs. 20 the highest premium (234) 63486-91.

———Storage for higher price (236) 63520-2.

———Transport: by cart in bulk, by rail in gunnies, by boat in bulk (225); higher rates for rice than for paddy (236) 63529-30.

Wape system: cultivator takes seed on credit and repays with share of crop at a very low price (234) 63479-80.

RESEARCH:

Commercial representation advocated (232) 63457-61; financial contribution from merchants (234) 63485-91.

STATISTICS:

Experiments as to yields advocated (229) 63404.

Groundnut: all channels of consumption should be traced (227), (231) 63434-5.

Land Records Department: crop reports of very little commercial importance as to cotton and groundnut (227); on an acreage basis; accurate as to rice (228-9) 63402-4; earlier information required; inaccuracy as to groundnut (236-7) 63531-41.

TARIFFS AND SEA FREIGHTS:

Cotton and groundnut products: customs duty and sea freight do not adversely affect prosperity of cultivator (226), (233) 63477-8.

Export cess on rice of Rs. 5-4-0 does not affect competition with other producing countries (235) 63498-9; on bran, would not affect price in Burma (235) 63502.

EXPORT DUTIES (*see under* **TARIFFS *and* SEA FREIGHTS**).

FERTILISERS.

ADULTERATION:

Legislation to prevent (*Hendry*) (56); not the cause of cultivators not using fertilisers (58) 61556; difficult to prevent (*Pan, etc.*) (196); analysis should be made by experts (*Shwe, etc.*) (382); is unknown (391).

Agricultural Department should stock and supply (*Hendry*) (56).

Ammonium sulphate: good effect on paddy nurseries demonstrated by Agricultural Department (*Pan, etc.*) (192); and superphosphate, only useful sources of nitrogen and phosphate for paddy (*Charlton*) (280).

AMMO-PHOS:

Analysis and price (*Hendry*) (56); controlled demonstrations carried out on cultivators' own fields (*McKerral*) (7); profitable (8); imported from America, for paddy, cultivators not using it (39) 61293-5; experiments show profitable return with paddy (*Hendry*) (56); has proved to be profitable (*Charlton*) (280); no commercial firm advertising and pushing sale of (284) 63960-2.

FERTILISERS—*contd.*

ARTIFICIAL MANURE:

Cheaper and will be profitable (*Hendry*) (56); a question of cost (58) 61550, (63) 61634-9; profit not sufficient hitherto (56); prices too high (*Charlton*) (280); not suitable for paddy cultivation, washed away by heavy rains (*Tun, etc.*) (207); not so profitable as natural manures (*Pan, etc.*) (196); and expensive (203) 63117-20; good, but not sufficiently increasing yield to cover expenses (*Dun*) (376); not used (*Shwe, etc.*) (391).

Artificial farmyard manure made at Hmawbi, but not profitable (*McKerral*) (7), (33) 61187-8.

Ashes of paddy husks, good (*Dun*) (376).

Basic slag: tests insufficient (*Charlton*) (280).

Bats' guano (*see* GUANO *below*).

Bone flour, ground, possibly of some use in sour paddy soil of Lower Burma (*Charlton*) (280), (288) 64018-26.

Calcium cyanamide, on swamp rice, inferior to sulphate of ammonia (*McKerral*) (7).

CATTLE MANURE:

Fuel, use of as, not practised (*McKerral*) (7); except by Indians (*Dun*) (376); (*Pan, etc.*) (192), (197); should be prohibited by law (*Gyi, etc.*) (398).

Inexpensive (*Maung, etc.*) (176).

Lost on waste grazing land (*McKerral*) (7), (40) 61297-9.

Nurseries, only enough for (*McKerral*) (7), (39) 61296-7.

Pit storage to increase quality and value (*Hendry*) (56).

Shortage of (*Dun*) (376).

Tenancy-at-will system discourages use of (*McKerral*) (7), (34) 61213-5.

Compensation should be given to evicted tenants for unexhausted improvements (*Dunn*) (87) 61832-4; no compensation to evicted tenants for unexhausted manure (*Hendry*) (57), (64) 61645-6.

Cost, a deterring factor (*Maung, etc.*) (176).

Cyanamide: tests insufficient (*Charlton*) (280).

Dhaincha plant as a green manure for paddy (*Charlton*) (290) 64053-7.

Demonstration necessary (*Shwe, etc.*) (382); (*Maung, etc.*) (172), (176); on cultivators' own plots (*Pan, etc.*) (192), (197); comparative (*Dun*) (376); (*Hendry*) (56); staff insufficient (58) 61557-60.

Farmyard manure, the only inexpensive fertiliser (*Maung, etc.*) (176).

Firewood: not of great importance except in dry zone and mainly a question of transport (*Hopwood*) (115).

Fish manure, used for garden cultivation but too expensive for paddy (*Hendry*) (56); not used (*McKerral*) (29) 61138-9.

Floods will not wash away manures once incorporated (*Hendry*) (64-5) 61640.

Green manuring: profitable with mechanical power (*Pan*, etc.) (196); not practised (*Charlton*) (290) 64051-2.

GUANO, BAT'S: Along Shan Hills; small quantities available (*McKerral*) (7); in forests of Tenasserim, right to collect sold by auction on 3 years lease (*Hopwood*) (120) 62273-5; used for garden cultivation, but too expensive for paddy (*Hendry*) (56).

Increased use of manures on high paddy land (*Maung, etc.*) (172).

Legislation to deal with fraudulent adulteration (*McKerral*) (7).

Lime: of good quality found in abundance (7); deficiency in nearly all paddy growing districts of Lower Burma (*Charlton*) (280), (288) 64018-26.

Mixtures of bonemeal and cowdung, advantageous (*Dun*) (375).

Natural manures, greater use of, the only thing that can be done at present (*Robertson*) (341); demonstration of storing, necessary (342).

Night soil, not used (*McKerral*) (30) 61140-2.

Nitrates: poisonous to swamp rice (*McKerral*) (7); useless on wet lands (*Charlton*) (280); injurious on paddy land in Lower Burma (*Hendry*) (57), (64) 61647-8.

Nitrogen, general shortage of (*Charlton*) (280).

Nitrogen and phosphate: considerably increase yield in paddy land of Lower Burma, but not sufficiently profitable hitherto (*Hendry*) (57); the limiting factors in Lower Burma rice soils (*McKerral*) (25) 61057-9.

Pelun, a leguminous plant, used as a green manure (*Charlton*) (290) 64053-7.

Phosphate, shortage of, in many districts (280).

FERTILISERS—*concld.*

Potash: rarely necessary for paddy (280); has no appreciable effect on swamp rice (*McKerral*) (7); beneficial but need for not so great as for phosphate and nitrogen (*Hendry*) (57).
Prawn dust, small quantities exported from Lower Burma to the Straits (*McKerral*) (7).
Prices of artificial fertilisers coming down and of rice going up (*McKerral*) (8); finance required (24) 61035.
Reclamation of land by use of fertilisers (*Pan, etc.*) (192).
Research: Crops other than rice in Lower Burma, not yet undertaken (*Hendry*) (57).
——————Experiments carried out fairly thoroughly (*Hendry*) (58) 61549-50, (62) 61616.
——————Insufficient; knowledge of secondary changes exceedingly important (*Charlton*) (280), (284) 63963, (288) 64016-7.
——————Rice (*Hendry*) 56-7.
Silting: profitable with mechanical power (196); in delta lands by sluices (*Pan, etc.*) (200-1) 63062-6 (*see under* **IRRIGATION**).
Sulphate of ammonia combined with phosphates increased rice yield up to 40 per cent but not profitable (*McKerral*) (7), (26) 61070-2.
Superphosphate: analysis and price (*Hendry*) (56).
Urea being investigated, but not hopeful (*Charlton*) (280), (284) 63963.
Value of fertilisers not appreciated by cultivators (*Hendry*) (58) 61556-60.

FINANCE.

Account keeping, knowledge of, required (*Dunn*) (66).
Agriculturists Loans Act: loans for the year 1925-26, 12 lakhs; has a moderating influence on interest rates of private moneylenders (*Dunn*) (103) 62000-3; should be administered by Agricultural Department (*Dun*) (374).
Amount for agriculture: Rs. 20 or Rs. 30 to Rs. 55 per acre (*Tun, etc.*) (211) 63192-4, (222) 63353-63.
Banking facilities: extension of, to rural parts advocated (*Dawson*) (254); cheques, use of, growing; dacoity encourages banking habits (258) 63711.
Banking knowledge necessary (*Dunn*) (66), (70) 61683, (71) 61687-8.
Burma Central Bank (*Dunn*) (93) 61881.

CHETTIES:

Charge 30 per cent interest, but rates decrease in face of competition of joint stock banks (*Dawson*) (259) 63733-4; useful but offend against canons of sound banking (260) 63757-60, (262) 63788-91; charge 24 per cent per annum for seasonal loans (*Maung, etc.*) (181) 62874-81; interest 18 to 36 per cent insists upon valuable security, not elastic (*Tin*) (104).
Co-operation: credit societies can give short term credit; but difficult to finance produce (*Dawson*) (255); not generally in competition with joint stock banks (258) 63718-21.
——————Godowns, receipts for produce being used for credit (*Dunn*) (70) 61683.
——————Movement should be encouraged and interest should be lowered (*Tin*) (104); (*Tun, etc.*) (206-7).
——————(*see* **CO-OPERATION**).
DAWSON'S BANK: (*see under* **DAWSON, L.**).
Egyptian experience of confusion of short and long term loans (*Dunn*) (76) 61737-9.
General improvement required (*Dunn*) (66).

GOVERNMENT LOANS:

Cannot do much (*Dunn*) (66).
Formality, delay, inadequacy, repayment instalments too large; Township officers should have authority (*Tun, etc.*) (206-7); Government should finance agriculture (211) 63189-94; French system at Pondicherry should be adopted (221-2) 63343-7, (222) 63353-63; four years should be allowed for repayment, interest should be lower, loans should be made in kind (*Gyi, etc.*) (397); at present must be repaid in 2 years (402) 64882; great difficulty in obtaining (*Dan*) (239) 63564-5; to cultivators at moderate interest advocated (*Dun*) (374); under Agricultural Loans Act and Land Improvement Loans Act unpopular (*McKerral*) (35-6) 61233-4.
Government should lend to cultivators on mortgage (*Maung, etc.*) (171).

FINANCE—*contd.*

Implements: Government should make loans for purchase of "Case" power farming machinery (*Pan, etc.*) (199).
Improvement, land, loans, careful extension of, advocated (*Robertson*) (341).
Insurance increasing (*Dawson*) (258) 63712-7.

INTEREST

Banks charge societies 10 per cent; societies charge members 15 per cent; excessive; has ruined societies and will strangle cultivators (*Sein*) (351) (*see* CAUSES OF BORROWING *under* **AGRICULTURAL INDEBTEDNESS**).
Co-operative credit societies Rs. 1-4-0 per cent per mensem, moneylenders Rs. 2-8-0 per cent per mensem with security, Rs. 3 to Rs. 5 per cent per mensem without security; advance payments for crops to be repaid in kind at harvest, *e.g.*, Rs. 80 advanced to be repaid at harvest by 100 baskets of groundnut, price of which will probably be Rs. 125 (*Gyi, etc.*) (397).
Excessive (*Shwe*) (388), (393).
Rates of chetties decreasing (*Dunn*) (73-4) 61726.
Rates paid by and to co-operative societies should be controlled by Government (*Maung, etc.*) (172-3). Rural credit societies charge 15 per cent to members and pay the Bank 10 per cent while moneylenders charge from 24 to 60 per cent. Rate charged to cultivators should not be increased (180-1) 62846-62, (181-2) 62874-86, (186) 62954-63; should be lowered (*Tin*) (104); joint stock banks 6 to 7 per cent Central Banks 10 per cent, primary societies 15 per cent (105), (106-7) 62037-42; rates have been decreased as the result of co-operation (109-10) 62100-4. Failures not due to interest being too low (110-1) 62121-8.
Joint stock banks: can operate in the delta where crops are secure and land easily marketable (*Dawson*) (254); can give short term credit (255); must specialise in long term deposits (256) 63666, 63677, (259) 63729-30.
Kazins, loans should be granted for building (*Tun, etc.*) (208), (213) 63217-20, (214) 63238-42.
Land in the delta easily realisable (*Dawson*) (255), (257) 63694-5.

LAND MORTGAGE BANKS: *see under* FINANCE *under* **SEIN, U.**

Advocated (*Pan, etc.*) (196); (*Tun, etc.*) (207); (*Dun*) (373); (*Gyi, etc.*) (397); (400) 64848-9, (404) 64920; can operate where crops less secure and land not easily marketable, because financed not by deposits but by long term debentures (*Dawson*) (255), (257) 63698-700, (259) 63729-30; draft Bill (*Dunn*) (76) 61736; elaborate, cultivator might not understand extent of his liability (85-6) 61804-12; independence of management (86) 61813-20; co-operative element should be introduced, with a nominated board (100-1) 61958-71; a demand for (102) 61990-2.

LONG TERM CREDIT:

(*Dawson*) (255); joint stock banks should provide; careful examination of applications necessary (256) 63666-71; not exceeding 10 years (256) 63679, (262) 63793-7; care taken to see that money is appropriated to purpose for which borrowed (257) 63696-7; danger of confusion with short term (*Dunn*) (76) 61737-41; essential (*Pan, etc.*) (191); for improved implements, *e.g.*, tractors (197); necessary for improvements (*McKerral*) (24) 61033-8.
Machinery for issuing loans required (*Dunn*) (102) 61990-2.
Marketing: Government should make loans to cultivators on easy terms (*Pan, etc.*) (198).
Moneylenders: (*see under* **AGRICULTURAL INDEBTEDNESS** and **CO-OPERATION**).
Registration of title of immoveable property (*Dunn*) (66).

SHORT TERM CREDIT:

Use of agricultural produce as security for, needs improvement (*Dunn*) (66), (70) 61683-4; period of crop 8 months, or for cattle 3 years (80) 61772-6; can be given by joint stock and Co-operative banks, but difficult to finance produce (*Dawson*) (255); not exceeding 9 months (256) 63679-80, (257-8) 63701-5; loans should be issued by Government at 10 per cent per mensem (*Shwe, etc.*) (380).
State bank advocated (*Sein*) (368) 64725.

FINANCE—*concld.*

TACCAVI :

Does not reach poorest; growing crops might be accepted as security; difficulty and trouble is applying for; advances in kind after a bad season; danger of too facile credit (*Robertson*) (341); should be lent through Co-operative banks at rates of interest not exceeding rate at which Government borrows (*Tin*) (104); but not for non-members (108) 62070-3, (110) 62119-20; should be given only where no Co-operative society can be formed; necessity of publicity (*Maung, etc.*) (173); should be retained but not extended (*Dawson*) (255); in colonies of Government Estates Department (*Dunn*) (94) 61883

Title; investigation takes a great deal of time (*Dawson*) (258) 63706, (260) 63745-7, (262-3) 63802-4.

Torrens system, doubtful (*Dunn*) (66); suitable to Australian conditions which are different from Indian (96) 61909-10.

FISH (*see under* **WELFARE OF RURAL POPULATION**).

FODDER (*see under* **ANIMAL HUSBANDRY**).

FORESTS.

AFFORESTATION :

Advocated near villages (*Shwe, etc.*) (385); no opening for (393); schemes in neighbourhood of villages would be detrimental to villagers in regard to their grazing (*Pan, etc.*) (194); no opening for in neighbourhood of villages, reservation necessary but reserves formed near villages very unpopular (*Hopwood*) (115-6), (118) 62231-8; a hopeless failure (119) 62250-2, (123) 62328-34.

Agricultural Department does not come into touch with Forestry Department (*McKerral*) (28) 61114-5.

AGRICULTURAL PURPOSES :

Full use not being made for (*Shwe, etc.*) (385); fullest use being made for (*Hopwood*) (115); strips of forest left unreserved for village use (120-1) 62277-82; distant forest of no use to villages (121) 62283-9; reservation of forest areas for villagers if villagers desire (121) 62290-2; forest land cultivated where profitable; in unclassed forests extraction by villagers free (122) 62312-6.

Area of reserved, should be ascertained (*Shwe, etc.*) (387).

Bamboo used for houses, mats, but for paper only experimentally (*Hopwood*) (124) 62339-41.

Bats' guano in forests in Tenasserim; right to collect sold by auction on 3 years lease (*Hopwood*) (120) 62273-5. (*See under* **FERTILISERS**).

Chaulmoogra oil for leprosy (*Hopwood*) (123) 62326-7.

Chestnut, not used much as timber (*Hopwood*) (119) 62245.

Classification of forests, vague (*Hopwood*) (121) 62293-5.

Conifers: mostly in Shan States; of very little value; Pinus Khasya (*Hopwood*) (119) 62246-9.

Cultivation in, should be extended (*Shwe, etc.*) (385), (393).

Cutch made in large quantities (*Hopwood*) (124) 62341.

Dehra Dun Research Institute has proved of value, will find a market for forest products and will increase employment (*Hopwood*) (120) 62270, (123) 62325; does not train Burma forest officers (123) 62324.

Dry zone: afforestation during last 25 years; attempted plantation of dry stony hills unsuccessful (*Hopwood*) (115-6), (118) 62235.

EROSION OF SOIL :

Does not arise in Burma except in small areas in Kachin Hills where there is shifting cultivation (*Hopwood*) (116), (120) 62265 (*see under* Shifting Cultivation *below*). Due to deforestation: difficulty of preventing (*Pan, etc.*) (194); none in consequence of deterioration of forests and floods (*Shwe, etc.*) (385).

EXTRACTION :

Of timber and bamboo for implements, building and firewood, licenses should be extended (*Shwe, etc.*) (385), (393); of wood for fuel and implements by cultivators should be permitted without license (*Pan, etc.*) (194); privilege should be extended (*Gyi, etc.*) (404) 64919.

FORESTS—*contd.*

FIREWOOD :

Not of great importance except in dry zone and mainly a question of transport (*Hopwood*) (115); plenty, if forest reservation ceased (*Gyi, etc.*) (399).
Floods : river training (*Hopwood*) (146).
Fodder : supply not part of duty of Forest Department (*Hopwood*) (116); no baling of grass (124) 62347-9. (*See under* ANIMAL HUSBANDRY).

GRAZING :

Charges, usually practically nothing (*Hopwood*) (117) 62218-20.
Deterioration of forests not being caused by excessive grazing (*Hopwood*) (116); (*Shwe, etc.*) (385), (393).
Disease introduced by unregulated grazing (*Hopwood*) (115); control necessary (116).
Facilities in forests, figures (*Hopwood*) (115), (117) 62215-6, (119) 62253-61; should be extended (*Shwe, etc.*) (385), (393); (*Gyi, etc.*) (404) 64919.
Grass varies in character (*Hopwood*) (118) 62239; no grass cutting (117) 62217; or baling (124) 62347-9.
Revenue for grazing 33,000 cattle in reserved forests in 1926-27 : Rs. 11,000 (*Hopwood*) (117) 62216.

Guano (*see under* **FERTILISERS**).

Irrigation : supply of water increased by forests at headwaters (*Hopwood*) (116); log drifting does not prevent streams being used for irrigation (125) 62350-61.
Labour employed in forests is agriculturist (*Hopwood*) (120) 62266-9; mainly local but some immigrant; 12 annas a day, no women employed; 150 forest villages (121-2) 62300-8.
Lac made in large quantities (*Hopwood*) (124) 62341.
Marketing of forest produce depends upon transport, but prices of timber too low to make railways and roads profitable (*Hopwood*) (122) 62309-11.
Oak, not much used as timber (*Hopwood*) (119) 62245.
Policy of department : not to make village reserves but to make plantations of valuable timber (*Hopwood*) (118) 62231-8.
Pyinmana Forest School, training during service (*Hopwood*) (123) 62319-24.
Rainfall, whether increased by forests, doubtful (*Hopwood*) (116).
Rangoon University, training for Forest Service (*Hopwood*) (123) 62319-24.
Rent for cultivated forest land, the same as for similar land outside (*Hopwood*) (122) 62307-8.
Research (*see under* Dehra Dun *under* AGRICULTURAL PURPOSES *above*) Locally, small problems, *e.g.*, chaulmoogra oil in leprosy (*Hopwood*) (123) 62326-7.
Reservation, control impossible without (*Hopwood*) (117) 62228-30; difficulty of (120) 62277-82.
Revenue of department over 2 crores, expenditure about 83 lakhs (*Hopwood*) (121) 62296-8.
Sawmills (*Hopwood*) (124) 62339-40.
Scattered all over Burma (*Hopwood*) (119) 62254, (120) 62266, (121) 62283-4.
Shifting cultivation : in Cachin Hills causes soil erosion and landslides (*Hopwood*) (116).
————————Causes serious damage (*Hopwood*) (117) 62221-7.
————————Control impossible without reservation (*Hopwood*) (117) 62228-30.
Species being developed by department : teak, pyinkado, padauk, ingyin (*Hopwood*) (121) 62299.
Staff : training at Forest School at Pyinmana and at Rangoon University; none trained at Dehra Dun (*Hopwood*) (123) 62319-24; some trained at Oxford (124) 62345-6.
Teak : more profitable than village plantations (*Hopwood*) (118) 62236-8; does not grow well over 2,800 feet (119) 62240-4. Planted by paid agriculturists (120) 62276, (121) 62299, (122) 62307-8; (*McKerral*) (25) 61056.
Tenasserim : dense evergreen forest, will be explored and proposed as reserved forest; not suitable for teak (*Hopwood*) (118-9) 62239-43. Bats' guano found in forests (120) 62273-5.
Timber cutting, uncontrolled, does great harm (*Hopwood*) (117) 62221-7.

TRANSPORT :

Facilities improving (*Hopwood*) (124) 62335-7.
Firewood supply mainly a question of transport (*Hopwood*) (115).

FORESTS—*concld.*

TRANSPORT—*contd.*

Prices of timber too low to make railways and roads profitable (*Hopwood*) (122) 62309-11.

Rivers, use of for drifting logs, does not prevent use for irrigation (*Hopwood*) (125) 62350-61.

Variety of timbers, great (*McKerral*) (18) 60941.

Wilful damage : none (*Hopwood*) (124) 62338.

FRUIT GROWING (*see under* **AGRICULTURAL INDUSTRIES**).

GALE, U MAUNG (witness) (*see under* **PAN**, *etc.*).

GALE, U YIN (witness) (*see under* **SHWE**, *etc.*).

GHOSH, C. C., B.A., F.E.S., Entomologist, Mandalay, (298-339).

Experience : of sericulture (302) ; of crop pests at Pusa (329) 64192-7.

AGRICULTURAL DEPARTMENT :

Agricultural chemistry, botany and probably engineering should be administered provincially ; entomology, mycology and bacteriology centrally (299).

AGRICULTURAL INDUSTRIES :

Bee-keeping : Research necessary (298) ; should be central as a separate department with a specialist ; local bee not suitable ; Italian bee should be introduced (299) ; no religious objection (330-1) 64208-11, (336) 64331-3 ; easy and profitable (332) 64241-9.

Buddhist religious objection to taking life : in many places not strict (300) ; no objection to bee-keeping and should be none to lac-culture (330-1) 64208-13, (336) 64331-5 ; sericulture : tradition and economic pressure overcome religious objection (333) 64254-9 ; people sympathetic to efforts to destroy pests (336) 64316-22.

Lac-culture : limited to particular areas (328), (331) 64212-4 ; no religious objection (330-1) 64208-13, (336) 64335.

Leisure period : varies (299).

Sericulture :

Ansorge : (322-4).

Artificial silk, *i.e.*, rayon : imports (314) ; legislation to prevent fraud (325) ; does not compete in India with natural silk which is largely used for ceremonial purposes (330) 64201-7 ; bought as natural silk ; import duty (333) 64260-4, (335-6) 64303-15.

Assam : (319).

Bengal : cause of decline in (309-10), (317-9), (323), (326).

Breeding silkworms : by mongrelisation (301), (304-6). Burma silkworm multivoltine ; yield same as Chinese ; Burma climatic conditions unsuitable for univoltine (333) 64271-6.

Bounty and State help : given by France, Ottoman Empire, Brazil, Austria and Japan (310) ; in India (324).

China : supplies 15 per cent of the world's raw silk (316).

Cloth, silk, large use of (299), (330) 64201-7.

Co-ordination : necessary ; lack of, cause of decline in Bengal (309-10), (323), (326-7).

Cottage industry : demonstration of rearing (301) ; economics (307-8) ; subsidiary to agriculture (334) 64286-92.

Criminals, habitual, taught sericulture (301) ; started at Pankkoung in October, 1927 (333) 64252-3.

Department in Burma : programme (301-2), (319), (338) 64370.

Development : lines of (320-2), (325) ; capable of very great expansion (333) 64250-1 ; especially where standard of life is low (336) 64323-6 ; can compete against imported silk if methods are improved (336) 64327-30.

Districts suitable (300-1), (320).

Dyeing : No departmental programme for (302) ; done by weavers ; best done in factories (309), (328).

Enquiries, recent, into the industry (316-7).

Eri silk : Confined to Assam, completely domesticated, feed on castor and kesern ; cocoons not reelable ; rearing and spinning a cottage industry. European demand for cocoons, (302-3), (326) ; no scope for extension of (338) 64365-6.

GHOSH, C. C.—*contd.*

AGRICULTURAL INDUSTRIES—*contd.*

Sericulture—*contd.*

Factories, filatures, necessary (301), (325).
Imperial Institute, Silk Committee: recommendations (325-6).
Imperial Sericulturist, proposed appointment of (327-8), (334) 64281-5.
Industry: in Burma, figures (300); in India (316).
Institute, Central Sericultural, proposed (326-7), (334) 64281-5.
Kashmir, Jammu and the Punjab (320), (326).
Khamru: home-reeled silk; coarse (308-09).
Lefroy, Imperial Entomologist: (302), (316-22); estimate of importance of silk industry in India (316); opinion as to cause of Bengal decline (317).
Ling Nan Agricultural College Bulletin on South China silk industry (316).
Madras: Kollegal tract (319).
Muga silk: Confined to Assam; semi-domesticated; fed on trees; cocoons reelable; highly prized golden silk; great improvement not expected (303), (326).
Mukherji's opinion as to decline of Bengal sericulture (317).
Mulberry: improvement trials at Leiktho (301); tree and bush (307); demonstration (328); large areas where it can be grown (338) 64367.
Mulberry silk: The principal commercial silk; improvement possible; univoltine and multivoltine sources of supply (303-4).
Mysore: The largest multivoltine rearing tract in India; suggestions (319), (323).
Pebrine disease: eliminated by Pasteur's microscopical examination (306-7); legislation not practical (325), (334) 64277-80.
Rawlley: on tariffs (311-3).
Rearing: Nurseries at Maymyo and Mandalay (302); conditions: climate, race, disease, food, tree and bush mulberry, nursing, economics of cottage industry (307-8); very great expansion possible (333) 64250-4.
Reeling: in factories, filatures: at Leiktho; at first by Department and later by private capitalists (301-2). Process; results of home reeling coarse (308-9); filatures should be located among rearers from whom cocoons should be bought direct (309); research as to cheap machinery necessary (328); in India reeling very bad (334) 64283.
Research: should be central, a separate department with a specialist (299); four assistants employed; object to increase silk yield (333) 64265-70.
Seed supply, should be a specialised industry (328).
Tariffs:

Manufacturing: Theory of the tariff and history in France, Germany, Switzerland, Austria, Russia, America and Japan (311-3); effect in India (324-5).
Throwing: history of industry in England, protected in America, Switzerland, France and Austria (310-1).

Tasar silk: completely wild worm; fed on trees; cocoons reelable; great improvement not expected; manufacturing industry important (303).
Throwing: Small factory to be at Mandalay (302). Thrown yarn imported machinery necessary (309); several filatures may combine to have a throwing mill (328).
Trade: in Burma figures (299-300); India, tables (313-6), (323).
Weaving: handlooms suitable (309); must be organised and in close touch with market (310).

CO-OPERATION:

Joint farming: societies consisting of families are best (329), (337) 64343-6.

CROPS AND CROP PROTECTION:

Pests, External: Special protection from Indian Peninsula required (329) 64183-5.
———, Bollworm, pink, all over Burma; difficulty because cultivators gin part of their own kapas (337) 64347-57.
———, Internal: *Chilo simplex* and borers, palm beetle, legislation required (329) 64184-7; cotton (329) 64188-91; Pusa not consulted except occasionally to identify pests (329-30) 64192-7.
———, Legislation necessary (336) 64319.
———, Paddy: borer damage avoided by altering time of planting (338) 64369.
———, Crabs caught in pots (338) 64369-70.
———, Propaganda by pamphlets (336) 64316-22. Research, should be centralised (298), (329).

GHOSH, C. C.—*concld.*

DEMONSTRATION AND PROPAGANDA :

Expert advice : cultivators do not require advice as to existing crops which they grow better than on Government farms (299).
Experimental farms in each district (299).
New varieties introduced by Agricultural Department : cultivators have quickly adopted, *e.g.*, hard sugarcane and Karachi gram (299).
Pests : posters and pamphlets issued (336) 64316-22.
Plots in representative soils for experiment (299).

EDUCATION :

Agricultural : Text books, elementary, cause laughter (298). Agriculture should not be taught in elementary schools (331) 64215-23.
Adult : night classes necessary (299) ; Maymyo adult school (332) 64235-40.
Middle class youths, attracting to agriculture : training and then practical work ; will not solve problem of mass of cultivators (298-9), (337) 64336-42, (338) 64363-4.
Nature study : urgent necessity, especially of insect life ; training teachers the first necessity (298), (332) 64227-34.
Night schools : necessary for adults and boys (299) ; Maymyo adult school (332) 64235-40.
School plots : not necessary in rural areas (298), (331) 64224-6.
Teachers : need of (298) ; for teaching nature study (332) 64227-34.

RESEARCH :

Entomology : agricultural, dealing with crop pests should be centralised, with sufficient staff to cover Provinces in co-operation with Indian Museum (298), (334-5) 64293-302, (338) 64359-62 ; (339). Systematic, should be confined to the Indian Museum (298) ; (330) 64198-200 ; (334-5) 64293-302. At present museums at Pusa, Dehra Dun and Coimbatore (337-8) 64358, (339).
Bee-keeping : No work being done ; staff should be appointed (298).
Pusa : criticism of (329-30) 64192-200, (334-5) 64293-302, (339).

GRAM (*see under* **CROPS AND CROP PROTECTION**).

GRAZING (*see under* **ANIMAL HUSBANDRY** *and* **FORESTS**).

GROUNDNUT (*see under* **CROPS AND CROP PROTECTION, MARKETING** *and* **TARIFFS** *and* **SEA FREIGHTS**).

GYI, U YIN, Ohnbin Village, Mahlaing Township; **HMAW, U LU,** Chairman, The Payitkon Central Co-operative Society, Ltd., and **TIN, THUGYI U BA** (395-404).

ADMINISTRATION :

Posts and Telegraphs : Lack of facilities in outlying small villages causes loss and delay of mails and telegrams (396).
Transport :
Railways and steamers : unjust demands made by subordinate officials, excessive delay and heavy freight charges ; Government should manage (396), (402) 64873-7.
Roads : lack of good village roads compels cultivators to sell their produce cheaply locally (396).

AGRICULTURAL DEPARTMENT :

Advice of, has always been followed (398).
Seed, paddy, supplied by Agricultural Department, premium of Rs. 10 per 100 baskets paid (401) 64863-5.
Services, have brought immense benefits to agriculturists (395-6), (400) 64838-9, (401) 64861-2.

AGRICULTURAL INDEBTEDNESS :

Agricultural Department should administer Government loans (396).
Attachment of cultivators' cattle for debt (403) 64904.
Causes of borrowing : Poor results of cultivation owing to irregular rains (395) ; high cost of living, irregularity of rainfall, lack of economy (397).
Land Mortgage Banks charging low interest should be started by Government (396).

GYI, U YIN, HMAW, U LU *and* TIN, THUGYI U BA—*contd.*

AGRICULTURAL INDEBTEDNESS—*contd.*

Mortgages, non-terminable, should be prohibited after Government has established land mortgage banks (397), (400-1) 64848-9.
Repayment prevented by poor yield and low prices (396); by unprofitable use of loans and exorbitant interest (397).
Restrictions on credit of cultivators inadvisable (396); Usurious Loans Act should be enforced and non-terminable mortgages should be prohibited after Government has established land mortgage banks (397), (400) 64848-9.
Sources of credit: jungle traders, brokers, *Chettyars* and Government (395); Co-operative credit societies, *Chettyars* (397).
Usurious Loans Act should be enforced (397).

AGRICULTURAL INDUSTRIES:

Cattle-breeding, a subsidiary industry (398).
Fruit-growing: may be profitable in suitable localities (398).
Handicraft or industrial institutions advocated (399).
Leisure period: Cultivation 160 days intermittently; during slack season carting or selling crops (398).
Mills, transfer to rural areas, not favoured (398).
Poultry rearing, may be profitable in suitable localities (398).

ANIMAL HUSBANDRY:

Fodder: shortage: due to Peninsular Indians, non-agriculturists, keeping cattle; scarcity very much felt from March to June (398).
Grazing: No grazing grounds in Chindwin district (398).
Indians, Peninsular, Non-agriculturists, keep cattle, sheep and goats, which eat the grass and raise price of stalks of millet and other fodder (398).
Plough cattle: 2 pairs for 40 acres (399-400) 64832-3, (401) 64850; usually bought; price very much increased; 10 years ago price of a pair of bullocks Rs. 200, present price Rs. 300 to Rs. 350 (401) 64850-5, (402) 64883.

CO-OPERATION:

Credit, Co-operative, is the cheapest (397), (400) 64846.
Government should encourage (399).
Minorities should be compelled to come into schemes for joint improvement (399).
Payitkon Central Co-operative Society, for the collection, sale and purchase of seed grain, Monyiwa Township, Lower Chindwin, has achieved its objects (399); has bought Rs. 13,000 worth of seed for distribution; buys ploughs from Agricultural Department and distributes them (400) 64834-7; among borrowers only a few defaulters (401) 64856-7; purchase and sale societies better than credit societies (401) 64858-60; 400 members; some owners, some tenants; drawn from an area of 2 square miles; unlimited liability; holder of Rs. 5 share liable up to Rs. 25; under new law society may be of unlimited liability which will be harmful to the society; seed given to members on credit; seed obtained for cash from Agricultural Department or from local selected cultivators; funds of society obtained from share capital or borrowed from Provincial Bank; this year a loss on one seed transaction; members apply to society for seed; society adds up indents and purchases; deals in gram, juari, red beans, wheat and *mungoo* beans; members who are sharing tenants, if land is good, pay owner half; in other cases owner takes two-fifths (402-3) 64884-903.
Progress: slow because loans are not utilised for purposes for which granted (400) 64846-7.
Sale and purchase societies better than credit societies (401) 64859-60.

CROPS AND CROP PROTECTION:

Cattle trespass: many cases; for instance, a loss of Rs. 40 on 6 acres of juar (404) 64911-5.
Karachi gram: Partly consumed by cultivator and partly sold (401) 64868-70.
Seed, paddy, supplied by Agricultural Department, premium of Rs. 10 per 100 baskets paid (401) 64863-5.

CULTIVATION:

Plough cattle: two pairs for 40 acres (399-400) 64832-3, (401) 64850; usually bought; price very much increased; 10 years ago price of a pair of bullocks Rs. 200; present price Rs. 300 to Rs. 350 (401) 64850-5, (402) 64883.

GYI, U YIN, HMAW, U LU *and* TIN, THUGYI U BA—*contd.*

DEMONSTRATION AND PROPAGANDA :

Farms for instructing agriculturists should be opened by the Agricultural Department (396).
Lectures should follow demonstration (395).
On cultivators own land, advocated (395).
Successful demonstration : harrow called *arlein*, iron harrow with five teeth, seed supplied by Agricultural Department, soaking seeds in diluted vitriol to prevent disease (395) ; Karachi gram and other seed (396).

EDUCATION :

Elementary school : Parents unable to keep children at school continuously owing to needing their labour (399).
Handicraft schools should be opened (399).
Mandalay Agricultural College : attended by very few cultivators ; value of agricultural education not appreciated (400) 64840-1.

FERTILISERS :

Cowdung, use of as fuel should be prohibited by law (398).

FINANCE :

Government loans : four years should be allowed for repayment, interest should be lower, loans should be made in kind (397) ; at present must be repaid in two years (402) 64882.
Interest : Co-operative Credit Societies Rs. 1-4-0 per cent per mensem, moneylenders Rs. 2-8-0 per cent per mensem with security, Rs. 3 to Rs. 5 per cent per mensem without security ; advance payments for crops to be repaid in kind at harvest, *e.g.*, Rs. 80 advanced to be repaid at harvest by 100 baskets of groundnut, price of which will probably be Rs. 125 (397).
Land Mortgage Banks should be established (397), (400) 64848-9, (404) 64920.

FORESTS :

Firewood : plenty, if forest reservation ceased (399).
Grazing, cattle, should be extended (404) 64919.
Timber for implements, extraction by cultivators, privilege should be extended (404) 64919.

HOLDINGS :

Consolidation should be effected by Government resuming occupation of lands and re-allotting, restricting mortgage, sale and partition (397-8).
Fragmentation : adversely affects agricultural efficiency due to division on inheritance or by gift to children, or mortgage or sale (397).

IMPLEMENTS :

Theikpan ploughs : obtained from Agricultural Department do in two days what Burmese ploughs do in three days (402) 64871-2.

IRRIGATION :

Dam, washed away by heavy rains (404) 64916.
Tanks should be constructed by Government in Lower Chindwin District, water tax being levied on lands irrigated (398).

LAND TENURE :

Sharing tenants : on good land, owner takes half, in other cases two-fifths (403) 64901-7.

MARKETING :

Basket, paddy, should be uniform (401) 64866-7.
Information as to market conditions, etc., should be supplied to cultivators by Government (399).
Middlemen's profits are excessive ; illustration : Rs. 175 paid by mills for 100 baskets of paddy for which cultivator received Rs. 100 (399).
Roads, village, lack of compels cultivators to sell produce cheaply locally (396).

GYI, U YIN, HMAW, U LU *and* **TIN, THUGYI U BA**—*concld.*

SOILS :

Chindwin, Lower, inundation owing to ruined state of old tanks (398), (402) 64877-8.
Jungle, culturable, should be sold to cultivators, payment being by easy instalments (398) ; could be worked at a profit (402) 64879-81.

VETERINARY :

Assistant : keeps medicines in his own residence (400) 64843-5 ; does not make unauthorised charges (404) 64910.
Contagious diseases : Legislation as to inoculation, movement and sale of cattle and carcases advocated (398).
Department has brought immense benefits to agriculturists (396), (400) 64842.
Dispensaries : Freely used by agriculturists (398) ; none in Monywa Township (400) 64843.
Inoculation : No fee charged (398).
Serum, supply of, sometimes insufficient (398).

WELFARE OF RURAL POPULATION :

Charity (403) 64905-7.
Cinema : would be appreciated as a novelty (403) 64909.
Opium smoking encouraged by Chinese (404) 64917-9.
Standard of living : impossible to make a living out of agriculture (401) 64858.
Surveys economic, advocated (399).
Wireless, not known (403) 64908.

HAN, U PO (witness) (*see under* **PAN, SAYA,** *etc.*).

HEALTH (*see under* **WELFARE OF RURAL POPULATION**).

HENDRY, D., M.C., I.A.S., Deputy Director of Agriculture, Southern Circle, Rangoon (56-66).

ANIMAL HUSBANDRY :

Cattle breeding : in Lower Burma, none, owing to swamp conditions (59-60) 61577-84.

CO-OPERATION :

Agricultural associations not run by co-operative societies (59) 61576.
Seed farms, little success (59) 61572.

CROPS AND CROP PROTECTION :

Adulteration should be prevented by extensive pure seed distribution (60) 61586-7, (61) 61597-9.
Catch crops after paddy harvest unsuccessful (66) 61680.
Crops could be grown from January to May if water were available (65) 61656-62.
Experimental stations in each agricultural circle undertake improvement of crops (57).
Fodder : Difficulty of growing in paddy lands of Lower Burma (57).
———Grasses (*Guinea, Merker,* foddercane, *Kikuyu*) introduced but not grown to any extent (57).
Fruit : importation from other countries best method of improving (57).
Garden crops, mixed, improvement work undertaken (57).
New crops, none can compete with rice in Lower Burma (57).
Rice : Exports from Burma over half the rice which goes into international trade ; quantity has increased steadily (62) 61613-4.
———Improvement, satisfactory progress : increased yield and premium (57), (65) 61654-5.
———Japanese and other short period varieties (60) 61592-6.
———in Lower Burma, occupies 90 per cent of cultivated area (57).
———Ngasein for export (61) 61610.
———Premiums on pure paddy (60) 61586-9, (61) 61597-9 ; but difficulty of marketing (64) 61641-2.
———Quality of Burma rice (61-2) 61609-13.
———Red rice, percentage being reduced (60) 61590-1.
———Varieties already in the country should be improved (57) ; hybridisation work (59) 61567, (64) 61643-4.
———Varieties under distribution (7) ; under study, several hundreds (60) 61585.

HENDRY, D.—*contd.*

CROPS AND CROP PROTECTION—*contd.*

Seed distribution: by Agricultural Department, no private agency (57), (61) 61600-5.
———Central seed farms, experimental and not expected to pay (65) 61664.
———Co-operative societies, little success in opening seed farms (59) 61572-4.
———District farms rented to tenants (65) 61665-8.
———Expansion satisfactory (57); on a large scale (58-9) 61561-2.
———Farms in each district necessary to save transportation cost (57); there are 32 in 6 districts (59) 61563-6, (61) 61606-8.
———Prices adjusted to equalise transport cost (65) 61663.
———Quality of seed, legislation not necessary (66) 61670-4.
Sugarcane: Horticulturist at Hmawbi Farm in charge (63) 61631-3.
———Prospects good: J-213 and B-3412 (63) 61628-30.
———Quality negligible in Southern Circle (63) 61628.

CULTIVATION:

Crops could be grown from January to May if water were available (65) 61656-62.
Rice: Intensive instead of extensive (62) 61615.
———Puddling (64) 61649.

DEMONSTRATION AND PROPAGANDA:

Agricultural improvement committees, none (63) 61627.
at Conferences, agricultural and co-operative (56).
in Cultivators' own fields near villages and roads (56); no specific guarantee (62) 61622.
Fertilisers, use of: staff insufficient for demonstration (58) 61557-60.
Lectures in cultivators' own villages (56).
Shows, exhibitions, etc. (62-3) 61622-7.
Touring of agricultural officers (59) 61570-1.

FERTILISERS:

Adulteration, legislation to prevent (56); not the cause of cultivators not using fertilisers (58) 61556.
Agricultural Department should stock and supply (56).
Ammo-Phos: analysis and price (56).
———Experiments show profitable return with paddy (56).
Artificial manure: Cheaper and will be profitable (56); a question of cost (58) 61550, (63) 61634-9.
———Profit not sufficient hitherto (56).
Cattle manure: pit storage to increase quality and value (56).
no Compensation to evicted tenants for unexhausted manure (57), (64) 61645-6.
Demonstrations should be on cultivators' own land (56); staff insufficient (58) 61557-60.
Fish manure, used for garden cultivation but too expensive for paddy (56).
Floods will not wash away manures once incorporated (64-5) 61640.
Guano, bats', used for garden cultivation, but too expensive for paddy (56).
Nitrates, injurious on paddy land in Lower Burma (57), (64) 61647-8.
Nitrogen and phosphate considerably increase yield in paddy land of Lower Burma, but not sufficiently profitable hitherto (57).
Potash beneficial but need for not so great as for phosphate and nitrogen (57).
Research: Crops other than rice in Lower Burma, not yet undertaken (57).
———Experiments carried out fairly thoroughly (58) 61549-50, (62) 61616.
———Rice (56-7).
Superphosphate: analysis and price (56).
Value of fertilisers not appreciated by cultivators (58) 61556-60.

MARKETING:

Cultivators suffer from unevenness and irregularity of methods (58) 61552-3.
no Demand for better methods (58) 61554.
Education, the method of improving conditions (58) 61555.
Rice, through middlemen: a difficulty in the way of improving quality (64) 61641-2.

HENDRY, D.—*concld.*

RESEARCH:

Fertilisers (56-7); experiments carried out fairly thoroughly (58) 61549-50, (62) 61616.
Millers: do not contribute financially (66) 61675-6.
——Organisation of committee advisable (66) 61677-9.
Staff (62) 61619-21.
Sugarcane at Hmawbi Farm (63) 61631-3.
Rice: Hybridisation (59) 61567, (62) 61617-8, (64) 61643-4.
——Improvement (65) 61654-5.

SOILS:

Analyses, occasional requests for (59) 61569.
Survey in Pegu District not quite completed owing to lack of staff (59) 61568.

WELFARE OF RURAL POPULATION:

Tharrawaddy District has become quieter (64) 61650-3.

HMAW, U LU (witness) (*see under* **GYI, U YIN**, *etc.*).

HOLDINGS.

"Agriculturist", definition of (*Dunn*) (95-6) 61902-4.
Arbitration by village committees advocated (*Shwe, etc.*) (391).

CONSOLIDATION:

Difficulty of Government action (375); no action should be taken (*Dun*) (375).
Minority should be compelled to come into schemes (*Jevons*) (268) 63828.
Owners of adjacent holdings should have right of pre-emption (*Shwe, etc.*) (381).
Prevented by customs of inheritance and lack of spirit of co-operation (*Pan, etc.*) (192).
Punjab work, very good (*Jevons*) (267) 63826-7.
Should be effected by Government resuming occupation of lands and reallotting, restricting mortgage, sale and partition (*Gyi, etc.*) (397-8).
Economic holding: 9 acres in North Prome, 22 acres in South Tharrawaddy (*Dunn*) (78-9) 61758-9.

FRAGMENTATION:

A Custom; to interfere with would be against wishes of cultivators (*Pan, etc.*) (192).
Adversely affects agricultural efficiency, due to division on inheritance or by gift to children, or mortgage or sale (*Gyi, etc.*) (397).
Not Excessive (*Dunn*) (67), (78-9) 61758-65.
Very little except in Arakan (*McKerral*) (24) 61039-40.
Indians not displacing Burmese (*McKerral*) (48) 61441-3.
Legislation necessary for consolidation (*Shwe, etc.*) (391).
Legislation necessary to deal with minors, widows and persons legally incapable, and to keep disputes out of the courts (*Dun*) (375), (*Shwe, etc.*) (381).
Plots: should be about 2 acres; loans should be granted for building high and straight kazins (*Tun, etc.*) (208), (213) 63217-20, (214) 63238-42.
Price of land follows price of paddy (*Dunn*) (96) 61905.

SIZE OF:

Varies; average figure over a wide area useless (*Dunn*) (84) 61802-3; average paddy land, 25 to 30 acres: the suitable size (*Tun, etc.*) (207).
Transfer by sale, 497,000 acres in 1925-6 in Lower Burma (*Dunn*) (96) 61905.

HOPWOOD, S. F., M.C., I.F.S., Officiating Chief Conservator of Forests, Burma (115-125).

ADMINISTRATION:

Transport, in forests:
Facilities improving (124) 62335-7.
Firewood supply mainly a question of transport (115).
Prices of timber too low to make railways and roads profitable (122) 62309-11.
Rivers, use of for drifting logs, does not prevent use for irrigation (125) 62350-61.

HOPWOOD, S. F.—*contd.*

AGRICULTURAL INDUSTRIES :

Cutch made in very large quantities (124) 62341.
Forests : labour employed is agriculturist (120) 62266-9; mainly local but some immigrant, 12 annas a day, no women employed, 150 forest villages (121-2) 62300-8.
——— —Large number of industries (124) 62339-41.
Lac made in very large quantities (124) 62341.
Mats made from bamboo (124) 62342-3.
Paper : no pulp manufacture (124) 62344.
Sawmills in forests (124) 62340.

ANIMAL HUSBANDRY :

Grazing (*see under* **FORESTS**).
Indians, non-agriculturists, keep half-starved cattle in Burma (119-20) 62261-4; should be heavily taxed (122) 62317; Burmans keep a few well-fed animals (125) 62349.

FERTILISERS :

Bats' guano in forests in Tenasserim, right to collect sold by auction on 3 years' lease (120) 62273-5.
Firewood : not of great importance except in dry zone and mainly a question of transport (115).

FORESTS :

Afforestation schemes, no opening for in neighbourhood of villages, reservation necessary but reserves formed near villages very unpopular (115-6), (118) 62231-8; a hopeless failure (119) 62250-2, (123) 62328-34.
Agricultural purposes, fullest use being made for (115); strips of forest left unreserved for village use (120-1) 62277-82; distant forest of no use to villages (121) 62283-9; reservation of forest areas for villagers if villagers desire (121) 62290-2; cultivated where profitable; in unclassed forests extraction by villagers free (122) 62312-6.
Bamboo used for houses, mats, but for paper only experimentally (124) 62339-41.
Bats' guano in forests in Tenasserim; right to collect sold by auction on 3 years' lease (120) 62273-5.
Chaulmoogra oil for leprosy (123) 62326-7.
Chestnut, not used much as timber (119) 62245.
Classification of forests, vague (121) 62293-5.
Conifers : mostly in Shan States; of very little value; Pinus Khasya (119) 62246-9.
Cutch made in large quantities (124) 62341.
Dehra Dun Research Institute has proved of value, will find a market for forest products and will increase employment (120) 62270, (123) 62325; does not train Burma forest officers (123) 62324.
Dry zone : afforestation during last 25 years; attempted plantation of dry stony hills unsuccessful (115-6), (118) 62235.
Erosion of soil does not arise in Burma except in small areas in Kachin Hills where there is shifting cultivation (116), (120) 62265 (*see under* Shifting cultivation *below*).
Firewood : not of great importance except in dry zone and mainly a question of transport (115).
Floods : river training (146).
Fodder : supply not part of duty of Forest Department (116); no baling of grass (124) 62347-9.
Grazing : Charges, usually practically nothing (117) 62218-20.
————Deterioration of forests not being caused by excessive grazing (116).
————Disease introduced by unregulated grazing (115); control necessary (116).
————Facilities in forests, figures (115), (117) 62215-6, (119) 62253-61. Indians keep half-starved cattle which are a curse (119-20) 62261-4; should be heavily taxed (122) 62317-8.
————Grass varies in character (118) 62239; no grass-cutting (117) 62217; or baling (124) 62347-9.
————Revenue for grazing 33,000 cattle in reserved forests in 1926-7 : Rs. 11,000 (117) 62216.
Irrigation : supply of water increased by forests at headwaters (116); log drifting does not prevent streams being used for irrigation (123) 62350-61.

HOPWOOD, S. F.—*concld.*

FORESTS—*contd.*

Labour employed in forests is agriculturist (120) 62266-9; mainly local but some immigrant; 12 annas a day, no women employed; 150 forest villages (121-2) 62300-8.
Lac made in large quantities (124) 62341.
Marketing of forest produce depends upon transport, but prices of timber too low to make railways and roads profitable (122) 62309-11.
Oak, not much used as timber (119) 62245.
Policy of department: not to make village reserves but to make plantations of valuable timber (118) 62231-8.
Pyinmana Forest School, training during service (123) 62319-24.
Rainfall, whether increased by forests, doubtful (116).
Rangoon University, training for Forest Service (123) 62319-24.
Rent for cultivated forest land, the same as for similar land outside (122) 62307-8.
Research (*see under* Dehra Dun *above*). Locally, small problems, *e.g.*, chaulmoogra oil for leprosy (123) 62326-7.
Reservation, control impossible without (117) 62228-30; difficulty of (120) 62277-82.
Revenue of department over 2 crores, expenditure about 83 lakhs (121) 62296-8.
Sawmills (124) 62339-40.
Scattered all over Burma (119) 62254, (120) 62266, (121) 62283-4.
Shifting cultivation: in Cachin Hills causes soil erosion and landslides (116).
————————, Causes serious damage (117) 62221-7.
————————, Control impossible without reservation (117) 62228-30.
Species being developed by department: teak, pyinkado, padauk, ingyin (121) 62299.
Staff: training at Forest School at Pyinmana and at Rangoon University; none trained at Dehra Dun (123) 62319-24; some trained at Oxford (124) 62345-6.
Teak: more profitable than village plantations (118) 62236-8. Tenasserim not suitable for; does not grow well at over 2,800 ft. (119) 62240-4. Planted by paid agriculturists (120) 62276, (121) 62299, (122) 62307-8.
Tenasserim: dense evergreen forest, will be explored and proposed as reserved forest; not suitable for teak (118-9) 62239-43; bats' guano found in forests (120) 62273-5.
Timber cutting, uncontrolled, does great harm (117) 62221-7.
Transport: Facilities improving (124) 62335-7.
Firewood supply mainly a question of transport (115).
Prices of timber too low to make railways and roads profitable (122) 62309-11.
Rivers, use of, for drifting logs, does not prevent use for irrigation (125) 62350-61.
Wilful damage: none (124) 62338.

IRRIGATION:

Forests at headwaters increase supply of water (116).
Log drifting does not prevent streams being used for irrigation (125) 62350-61.

MARKETING:

Timber, depends upon transport; but prices too low to make railways and roads profitable (122) 62309-11.

RESEARCH:

Chaulmoogra oil in leprosy (123) 62326-7.
Dehra Dun Research Institute, has proved of value, with a view to finding market for agricultural products and increasing employment (120) 62270-2.

SOILS:

Shifting cultivation: in Cachin Hills causes soil erosion and landslides (116).
————————, Causes serious damage (117) 62221-7.
————————, Control impossible without reservation (117) 62228-30.

HOUSING (*see under* **WELFARE OF RURAL POPULATION**).

HYGIENE (*see under* **WELFARE OF RURAL POPULATION**).

IMPERIAL AGRICULTURAL ASSOCIATION, proposals for: (*see under* JEVONS, PROF. STANLEY H., M.A., B.Sc., F.S.S., F.G.S.)

IMPLEMENTS—

Agents for sale of, necessary (*Maung, etc.*) (177).
Agricultural Department has designed: ploughshare for Burmese plough body, screw water lift with windmill, seed drill, improved furnace for jaggery (*McKerral*) (9-10), (30) 61143-50, (51) 61485-7.
"Case" power farming machinery, the best (*Pan, etc.*) (199); for dry land; cannot be used on wet, muddy land (202) 63099-106, (204-5) 63155-9; seven tractors sold (205) 63160-3.
Chaff-cutting machines used in dry zones (*Robertson*) (347) 64445.
Cochin China, French: tractors used for paddy cultivation (*Jevons*) (274) 63900.
Competitions should be held (*Pan, etc.*) (197).
Cultivators: not unduly conservative in use of improved implements (*Robertson*) (347) 64445-7.

DEMONSTRATIONS:

Necessary (*Maung, etc.*) (176); in the field advocated (*Dan*) (238); on cultivators' fields, have been successful (*Pan, etc.*) (192); (197); "Case" dealers are prepared to give demonstrations (199).

DISTRIBUTION:

Should be by local traders after popularisation by Agricultural Department (*Robertson*) (342); local traders would require 25 per cent profit (346-7) 64430-40; not widespread; should be at cost price on easy instalments by Government or co-operative societies (*Pan, etc.*) (197); loans should be made by Government to cultivators for the purchase of complete sets of "Case" power farming machinery, costing Rs. 4,810, to be repaid in 2 years (199).

Engineering, agricultural, need for development (*Jevons*) (266), (274) 63899-901.
Existing implements are best adapted to needs of the country (*Tun, etc.*) (207).
Expert, whole-time, required (*McKerral*) (10).
Government, local, should supply agriculturists with funds to buy implements (*Shwe, etc.*) (383).
Gwin-set revolving harrow should be demonstrated (*Shwe, etc.*) (390-1).
Improved implements: requirements: seed-drill, harrows, inter-cultivator, implements for collecting cotton and jowar roots, and for harvesting groundnuts (*Robertson*) (342), (347) 64441-4; in dry tract (347) 64449, (348) 64467-8, (349) 64481.
Long-term loans advocated (*Pan, etc.*) (197).
Loss of time and outturn owing to inefficient implements (*Shwe, etc.*) (383).
Machinery: introduction of, would oust manual labourer from his occupation (*Tun, etc.*) (207).
Manufacture locally of ploughshares (*McKerral*) (51-2) 61488-92.
Manufacturers' lack of knowledge of local conditions, an obstacle (*Pan, etc.*) (197).
Middlemen's profits raise price above means of cultivator (*Pan, etc.*) (197).
Paddy reaping machine introduced 40 years ago, but heavy and unsuitable (*Dan*) (238).
Plough: for paddy apparently succeeding (*McKerral*) (9); in the dry zone for cotton and groundnut (36) 61235. (*See under* THEIKPAN PLOUGH *below*).
Price of imported implements, the main difficulty; payment by instalment advocated (*Robertson*) (342).
Requirements: light enough for bullocks, cheap, to be adjusted and repaired locally (*McKerral*) (9).
Seed-drill: improvement of, requires investigation (*Robertson*) (342); leaves a furrow which heavy rain fills with soil and seed does not come up; cross-harrowing suggested (346) 64414-6.
Small implements, considerable scope for (*McKerral*) (36) 61235-7.

THEIKPAN PLOUGH:

Advocated (*Robertson*) (340 and 342); combines some advantages of western plough with cheap frame, a little heavier than indigenous plough, and goes a little deeper; depth of ploughing by (345-6) 64405-13; obtained from Agricultural Department; does in 2 days what Burmese plough does in 3 days (*Gyi, etc.*) (402) 64871-2; an improvement of the indigenous plough, introduced by Agricultural Department, is inexpensive and saves time and labour (*Maung, etc.*) (176-7); has become very popular (192); one ploughshare can be used instead of two, saves time, surface and composition of soil are made even (*Pan, etc.*) (204) 63145-7.

IMPLEMENTS—*contd.*

Threshing machine: works perfectly but too heavy (*Dan*) (238).
Tractors, threshers and other heavy machinery too expensive and difficult to transport (*McKerral*) (9).
Tractors: many Fordsons sold for paddy cultivation, ploughing being done before the rains (*Jevons*) (266), (267) 63824-5, (274) 63899-901.
Weed cutter, mechanical, advocated (*Shwe, etc.*) (392).

INFANTILE MORTALITY (*see under* **WELFARE OF RURAL POPULATION**).

INSEIN VETERINARY COLLEGE (*see under* **VETERINARY**).

IRRIGATION.

Ava Canal, reservoir on Samon being investigated (*Stuart*) (245).
Average annual irrigation decreased in 1901-5; explanation (*Stuart*) (241-2).
Bawle Island in Insein District, attempt to prevent floods (*Stuart*) (249).
Bribery of officers of Canal Department (*Shwe, etc.*) (381).
Bunds (*see under* Embankments *below*).

CANALS:

Four major: figures of irrigation done by; 99 per cent under rice (*Stuart*) (242); constructed from funds supplied by Government of India, but purchased Government of Burma in 1921-2 (243). Surplus of water: *mayin* instead *kaukgyi* crops (*Robertson*) (349) 64479-80.
Canals and embankments, construction and maintenance of by district councils under Burma Self-Government Act, 1921, requires unanimous consent (*Dunn*) (69), (80) 61770-1.
Consolidated rate charged on all irrigated areas (*Stuart*) (243); does not lead to less economy in use of water (253) 63647-54.
Cost of irrigation low, lack of expansion due to lack of opportunity (*Stuart*) (253) 63645-6.
Cotton: scope for, doubtful (*Edwards & Nelson*) (230) 63421-2.
Dam, washed away by heavy rains (*Gyi, etc.*) (404) 64916.
Department: responsible for maintenance of navigable channels declared main waterways by Local Government (*Stuart*) (249) 63585; can manage both subjects (251) 63619.
Distribution of water: application of more scientific methods has increased area irrigated (*Stuart*) (244); satisfactory (*Maung, etc.*) (172); unsatisfactory (*Shwe, etc.*) (381), (391).
Drainage and reclamation: (*Stuart*) (248-9).
——————— Contour surveys (*Stuart*) (248).
——————— Without embankments, very successful (*Stuart*) (248).
Embankments: receive a credit of 50 per cent of gross land revenue demand on areas protected by them; particulars; committee to examine the question (*Stuart*) (247-8); benefit protected areas but detrimental to areas outside protection, because they force up flood levels (250) 63603; not insanitary (250) 63604-5; should be removed (*Stuart*) (251) 63620-5, (252) 63628-9, (254) 63662.
Excess of water in Irrawaddy Division (*Maung, etc.*) (171).
Financial results: table (*Stuart*) (243).

FLOODS:

Practically every year, doing an enormous amount of damage; two committees appointed; department dealing with (252) 63636-40; (*Pan, etc.*) (191-2); measures to prevent, necessary (*Shwe, etc.*) (391).
Forests at headwaters increase supply of water (*Hopwood*) (116).
Irrawaddy: problems of conservancy, not irrigation (*Stuart*) (249) 63581-4; a building-up river; deposit of silt (250-1) 63597-612; proposal to bund at neck of Delta to save silt (*McKerral*) (24-5) 61045-8, (34) 61216.
Kalabyagi Canal in Yamethin District, under consideration (*Stuart*) (245).
Kyaukse District: canals irrigate about half total irrigated area bearing crops other than rice; double cropping, e.g., sesamum before rice (*Stuart*) (242); area irrigated 1901-25 (244); Panlaung River scheme (244); Pyaungbya and Paleik Canals being re-modelled (245).

Land Records, Superintendent of, works in consultation with Executive Engineer (*Stuart*) (243), (253) 63647-50.
Levels of older works followed, with one unfortunate exception (*Stuart*) (254) 63664.
Log drifting does not prevent streams being used for irrigation (*Hopwood*) (125) 62350-61.
Magwe District: survey being prepared (*Stuart*) (245).
Man Canal in Minbu District re-modelled (*Stuart*) (245).
Meiktila District: tank projects being considered, for protective purposes (*Stuart*) (245-6).
Mileage of Government irrigation channels increased 45 miles per annum for 25 years (*Stuart*) (242).
Minor irrigation works: in Sagaing District, handed over to cultivators; Government maintenance unnecessary (*Stuart*) (251-2) 63626-7, (252) 63630-5; advice necessary (*Shwe, etc.*) (394) 64815.
Mon, North, Canal, a new distributary sanctioned (*Stuart*) (244).
Mu Canal in Shwebo District: surveys in progress (245).
Myanaung embankment area: drainage problem to be considered (*Stuart*) (248).
Nankwe scheme, in abeyance (*Tun, etc.*) (212) 63213-6.
Navigation channels (*Stuart*) (246).
Paddy: continuous water-supply essential (*Dun*) (374-5); water should be given earlier (*Shwe, etc.*) (394) 64814.
Paleik Canal being re-modelled at cost of 3½ lakhs (*Stuart*) (245).
Panlaung River: scheme for construction of flood-modulating reservoir sanctioned for 43 lakhs (*Stuart*) (244).
Plots: should be about 2 acres in size; loans should be granted for building high and straight kazins (*Tun, etc.*) (208), (213) 63217-20.
Progress since 1901; lists of canals and cost (*Stuart*) (240-2).
Pyaungbya Canal: being re-modelled: cost 7 lakhs (*Stuart*) (245).
Pyuntaza Plain streams: annual flooding (*Stuart*) (248).
Research: River Irrawaddy: sufficient known as to silting and scouring action (*Stuart*) (251) 63611.
Revenue: Collected by Civil Officers (*Stuart*) (244).
———— Canal Revenue Staff amalgamated with Land Revenue Staff on Shwebo Canal; arrangement being introduced in other districts (*Stuart*) (243-4); a satisfactory system (253-4) 63655-61.
Salin Canals, scheme for re-modelling sanctioned: cost 27 lakhs (*Stuart*) (244).
Scope for irrigation of 100,000 acres in Sagaing and Kyauksee Districts, but cost prohibitive (*Stuart*) (254) 63663.
Schemes necessary (*Shwe, etc.*) (381), (391).
Shwebo Canal: to be re-modelled: cost 10 lakhs (*Stuart*) (244).
Silting: by River Irrawaddy; scouring and silting actions; difficult to increase deposit by sluice gates in the embankments. Research: sufficient already known (*Stuart*) (250-1) 63597-612; (*McKerral*) (24) 61041-8, (32) 61184-6; (*Shwe, etc.,*) 391; (*Pan, etc.*) (200-1) 63062-6.
Sittang River: most unstable, danger of cutting bunds (*Stuart*) (252-3) 63641-4.
Staff: inadequate (*Stuart*) (249).
Statistics, hydrographical, being collected and collated (*Stuart*) (249).

TANKS:

Should be constructed by Government in Lower Chindwin District, water-tax being levied on lands irrigated (*Gyi, etc.*) (398) (*Maung, etc.*) (171).
Supervision of construction of small tanks advocated (*Robertson*) (341); not control but giving advice; an officer should be responsible (344) 64386-91.
Taunggan tank in Mandalay District being re-modelled: cost Rs. 62,000 (*Stuart*) (245).
Thitson and Samon Rivers, contour survey carried out with a view to co-ordination (*Stuart*) (245).
Toungoo District, attempt to reclaim by drainage (249).
Tube well, not satisfactory (*Stuart*) (251) 63613-8.
Upper Burma: Area irrigated trebled since 1901 (240).
———— Dry zone, irrigation has been practised from time immemorial (*Stuart*) (240).
———— Urgent need in Yamethin, Meiktila, Myingyan, etc. (*Tun, etc.*) (207).

IRRIGATION—*concld.*

Wastage by evaporation and absorption in the soil should be prevented by reservoirs and gardens and trees (*Shwe, etc.*) (381).
Water hyacinth: problem under Irrigation Department; (*Stuart*) (249-50) 63589-96 (*see under that title*).

WELLS:

In dry zone: possibilities should be investigated (*Robertson*) (341); no tube-wells (344) 64377-8; should be undertaken by Agricultural Engineer (344) 64392; country not suitable for (*McKerral*) (24) 61036-8, (52) 61495-6; should be provided (*Maung, etc.*) (171).
Wundwin chaung in Meiktila District: storage reservoir for 3 lakhs (*Stuart*) (245).
Yenatha Canal in Mandalay District: estimate under preparation for construction of (*Stuart*) (245).

JEVONS, PROF. STANLEY H., M.A., B.Sc., F.S.S., F.G.S., Professor of Economics, University of Rangoon. (264-78).

Experience: nine years in Allahabad, four years in Rangoon (271) 63863-4.

ADMINISTRATION:

Development: agricultural, importance of; Government should raise loans, if necessary (270) 63853-8.
———— industrial, desirable (275-6) 63912-6.
Meteorological: data required for: Commercial air traffic and ships (266).
———— New plants and crops (266).
———— Vital statistics and forecasting epidemics (266).
Service: Bengal, example of (266), (267) 63821-4.
———— Experimental farms should take observations (266).
———— Inadequate (265); whole-time officer required (266).
———— Supervision required (269-70) 63843-50.
Transport: Roads: feeders to railways more important than trunk roads; network of village roads required (271-2) 63867-8.

AGRICULTURAL DEPARTMENT:

Branches required (266).
Engineering, agricultural, need for development (266), (274) 63899-901.
Services of: remarkably good work in the circumstances (266).
Staff: inadequate; should be 5 times as large; European and trained Burman officers required (266), (274) 63902.

CO-OPERATION:

Minority should be compelled to come into schemes for joint improvement (268) 63828.
Progress: lack of, due to non-payment of dividends and not operating as saving societies (271) 63865-6.

CROPS AND CROP PROTECTION:

New crops, introduction of: meteorological data required (266).

DEMONSTRATION AND PROPAGANDA:

on Cultivators' own fields, advocated (265).
Direct propaganda by Agricultural Department by posters and leaflets distributed in villages, should precede demonstration (265).
Higginbottom's work at Allahabad (267) 63818.
Indirect propaganda: of great importance; Universities and Education Department should create an atmosphere of interest in agriculture; patriotism should be aroused; permanent agricultural exhibition required in Rangoon (265), (267) 63816-20; Hmawbi Farm inaccessible (274) 63898. (*see* Imperial Agricultural Association below).
Literature, agricultural, non-official, paucity of (265); land-owning class largely, literate (270) 63851-2.
Ram, Sir Ganga: farming operations in the Punjab (267) 63818.

JEVONS, PROF. STANLEY H.—*contd.*

EDUCATION :

Adult (275) 63907.
Agricultural research and demonstration station required in immediate vicinity of Rangoon (265); Hmawbi Farm inaccessible (274) 63898.
Economics : Professors should lay stress on importance of agriculture (265); agricultural economics a compulsory subject in Rangoon University (273-4) 63887-95.
Literacy : desirable that it should accompany but need not necessarily precede improvement in standard of life (268) 63829; considerable among land-owning class (270) 63851-2.
Literature, agricultural, non-official ; paucity of (265), (270) 63851-2.
Rangoon University : teaches rural and agricultural economics (265), (273-4) 63887-95 ; would be willing to co-operate with proposed Board of Economic Enquiry (274) 63896-7.
Students : not critical of teaching (271) 63860-2 ; do not desire to study agriculture (274) 63902.
Technical : scholarships abroad, with the object of furthering industrial development (275-6) 63912-6.

HOLDINGS :

Consolidation : Minority should be compelled to come into schemes (268) 63828.
——————— Punjab work, very good (267) 63826-7.

IMPERIAL AGRICULTURAL ASSOCIATION : Proposals for :

Co-ordination with Agricultural Department (278) ; relation to Board of Agriculture (275) 63905-6.
should be Imperial rather than provincial (275) 63903-6.
Initiation : dependent upon support (278).
Methods : publishing journals, etc., in English and vernacular, lectures, exhibitions, coloured posters (278).
Object : to arouse interest in improvement of agriculture among all classes, including towns (277-8).
Red Cross Society : analogy of administration (275) 63903-4.
Subscriptions (278).

IMPLEMENTS :

Cochin China, French : tractors used for paddy cultivation (274) 63900.
Engineering, agricultural, need for development (266), (274) 63899-901.
Tractors : many Fordsons sold for paddy cultivation, ploughing being done before the rains (266), (267) 63824-5,(274) 63899-901.

MARKETING :

Roads : network of village roads required (271-2) 63867-8.

STATISTICS :

Agricultural : importance of (273) 63884-6.

TARIFFS AND SEA FREIGHTS :

Export cesses : Rice : incidence largely on producers (275) 63908-11.
——————— Rice and oils, has been appropriated to Central Revenues; special taxes for particular purposes are very useful in early stages of development (276-7) 62923-8.

WELFARE OF RURAL POPULATION :

Board of Economic Development, advocated (269) 63842.
Buddhist point of view compared with Western materialism (272) 63869-80.
Character of the people : take an uneconomic view of life, but character not fixed (270-1) 63856-9, (272) 63869-80.
Cholera : an occupational disease, characteristic of harvest workers, due to drinking filthy water when thirsty (264).
Communications, importance of, in creating desire for better living (268) 63835-6, (276) 63917-22.

JEVONS, PROF. STANLEY H.—*concld.*

WELFARE OF RURAL POPULATION—*contd.*

Diseases, preventible, cause immense economic waste by deaths of workers at prime of life; loss estimated at over 10 crores of rupees per annum (264), (266) 63810.

District health officer in each district with trained staff, advocated (265).

Drinking water, very little done towards safeguarding (265); pure supply, importance of economically (266-7) 63811-5.

Industrial development desirable to maintain standard of life; but sanitary conditions must be secured in towns (275-6) 63912-6.

Plague, an occupational disease, affecting workers in and about rice-mills, grain godowns and shops (264).

Population, pressure on soil (268) 63830-7; compared with Western history (272-3) 63881-4.

Public Health Department: has not been able to safeguard health of rural population except by vaccination and staying progress of epidemics (265).

Punjab canal colonies: standard of living being raised (269) 63839.

Sanitary precautions: very little instruction of the people (265).

Standard of Living: Literacy desirable but not necessary preliminary to raising standard of life; agriculture must be made more productive, but danger of increased production being eaten up by increased population; communications create desire for better living (268) 63829-36, (275) 63917-22; importance of correlation and concentration of different measures for improvement; the Punjab example; Board of Economic Development advocated (268-9) 63837-42; Government should raise loans if necessary (270) 63853-8; industrial development desirable (275-6) 63912-6.

JOLLY, MAJOR G. G., C.I.E., M.B., Ch.B., D.P.H., D.T.M. & H., I.M.S., Officiating Director of Public Health, Burma (147-168). Experience at Delhi and in Africa (163) 62759.

ADMINISTRATION:

Public Health District Organisation (161-3) 62729-60.

CO-OPERATION:

Improvements, societies for effecting, should be established after formation of health service under district councils (147).

EDUCATION:

Hygiene, importance of (165-6) 62787-94.

SOILS:

Reclamation schemes in Delta by pumping silt will improve public health (163-4) 62761-2.

WELFARE OF RURAL POPULATION:

Beri-beri: a few outbreaks, mainly in isolated districts, forests, etc.; not alone due to consumption of polished rice; very little polished rice eaten (158) 62683-9.

Buddhist religion: prejudice against taking life leads to spread of plague through rats (147), (165) 62780.

Central Public Health Department under-staffed and must be developed (149), (153).

Children: medical inspection in Anglo-vernacular schools, a rudimentary system. Child welfare work valuable as educational propaganda (151); practically no rural child welfare; shows held in the towns (163) 62750-2. Proposed Assistant Director of Public Health for schools (164) 62772. (*See under* Infantile mortality *below.*)

Cholera: causes panic but not so serious as malaria, hookworm, dysentery including diarrhœa (154) 62627-30; outbreaks begin in dry weather when wells are low; a problem of water supply (161) 62721-3.

Communications: improvement of, destroying isolation of, village which is its only defence against infectious disease, (148); (161), 62728.

JOLLY, MAJOR G. G.—*contd.*

WELFARE OF RURAL POPULATION—*contd.*

Co-operative societies: for improvements should be established after formation of health service under district councils (147). Distribute quinine; no anti-malaria societies (157) 62674-5.

Department of Public Health: in relation to the Medical Department (160) 62711-2; likely to develop (163) 62760.

Diet: Adequate and well balanced (147); (167) 62804. Beri-beri, not alone due to eating rice; very little polished rice eaten; has not heard of any lathyrism; nutrition problems of great importance; central institution should be set up with outlying laboratory in Burma (158) 62681-94. Compared with Punjab diet (160) 62715-20. Research at Public Health Institution (163) 62753-5; "Pe-bin-pank" eaten in Burma and China (160) 62719, (168) 62815-6; (*See under* Eggs, Fish, Milk *and* Rice *below.*)

Disease easily communicated through water supply, methods of disposal of refuse, etc., housing leading to malaria (147). Malaria, hookworm, dysentery and diarrhœa the most serious; cholera not so serious (154) 62626-30.

Dispensaries: for distributing medicine and treatment of disease; do not help in public health; Sub-Assistant Surgeons in charge. Has not come across any lady doctors in dispensaries (161-2) 62732-8. Municipalities run their own dispensaries with financial aid from district boards and provincial revenues, under technical supervision of Inspector General of Civil Hospitals (162-3) 62744-9.

District Health Service: Practically none: part-time services of one Medical Officer per 300,000 persons and 26 Sanitary Inspectors in a rural population of 12 millions (148). Should precede treatment of special diseases (151-2). Scheme approved by Finance Committee (157) 62670-1, 62676. Financial difficulties (164) 62772-6. Organisation into districts and circles (161) 62729-31, (164-5) 62775-7. For many years its work will be mainly educative; legislation necessary (165-7) 62787-98.

Health Officers:

At present only nominal; should be full-time, Burmans, one for each circle, half-pay grant system (148-9). Should be well paid (152). District Health Officer is the Civil Surgeon; carries on private practice and is over-worked (162) 62743.

Drinking water: river supply dangerous (cholera); properly constructed shallow wells should be provided (149-150). Very little done to improve; practically all rivers contaminated (157-8) 62677-80. Cholera, a problem of water supply (161) 62721-3.

Eggs: very little eaten (159) 62704-5.

Engineering Section of Public Health Department should be strengthened (150), (152).

Environmental conditions: not much can be done to improve, in the absence of district health service. Villagers must be aroused to possibilities of improvement (149). Change of attitude towards, in the towns, but not in rural areas (165) 62778-80. Village not more subject to disease than town (167) 62799-800.

Expectation of life, though higher than that of other Indian Provinces, pitiably low compared with European standards (147).

Finance: Municipalities receive financial aid from district boards and provincial revenues for dispensaries (162-3) 62744-9. Finance Committee sympathetic to public health service (163) 62757-8. Grants from Indian Research Fund Association for beri-beri research and Pasteur Institute. No assistance from Rockefeller Institute (164) 62764-8. Small proportion of public health budget spent in rural areas (164) 62771. Financial difficulties (164) 62776.

Fish: fresh or dried (ngapi) eaten with rice (159) 62700-3, as a relish 62708. Research (163) 62753-5.

Hookworm: Latrines (150). No general policy except propaganda. Use of latrines decreases incidence. Infection mostly through the feet; shoes or sandals a principal preventive. Experiments in Assam very significant but conditions different (156) 62653-7, (167) 62805-6. Excessive heat and rain destroy hookworm (165) 62786. Less prevalent among the Shans who eat raw meat (167) 62807-9.

Housing: mat and thatch raised on piles, possibly protects against Kala-e-azar, but affords cover for malaria mosquitoes. Offers facilities for rats; a few minor alterations in design would make a great difference (150), (167) 62799. Economic difficulty (165-6) 62789-90.

Individual health: measures to improve, should follow environmental hygiene; vaccination for small-pox an exception (151).

JOLLY, MAJOR G. G.—*contd.*

WELFARE OF RURAL POPULATION—*contd.*

Infantile mortality terribly high (147); malaria one of the principal causes (155) 62646-9. (*See under* Milk *below.*)

Inspector General of Civil Hospitals: in charge of medical training (159) 62696; of subsidised practitioners (157) 62672-3, and of maternity (162) 62740-2. Supervises hospitals under municipalities (162) 62744-5, (163) 62748.

Isolation of villages prevents spread of disease (147); but no other defence and improved communications are destroying this isolation (148), (161) 62728.

Kala-azar: mat and thatch houses raised on pile possibly protect against (150); not endemic; can be mistaken for malaria; Arakan threatened with (154-5) 62637-40.

Lathyrism: has heard of none (158) 62690.

Latrines: in dry zone deep pit; in flooded areas septic tank. Officer on special duty should be appointed (150). Wearing of shoes when visiting (151).

"Makkalam": used as the name of many diseases (167) 62801-3.

Malaria: Co-operative societies distribute quinine; no anti-malaria society (157) 62674-5.

————, Cultivation as a factor in getting rid of (161) 62724-7.

————, Housing, mats and thatch shelter mosquito (147), (150).

————, Imported infection worse (155) 62642-3.

————, Kala-azar can be mistaken for (154) 62631-40.

————, Kyaukpyu: drainage and stopping wet cultivation (154) 62631-6.

————, Mosquito netting should be woven locally (150).

————, Quinine necessary (150). Distribution insufficient; should be given free to everybody but financial difficulties too great (155) 62644-6. Cinchona febrifuge distributed: as good as pure quinine (155) 62650-2. Co-operative societies distribute (157) 62674.

————, Season varies; worst at beginning and end of rains (155) 62641.

————, Village site, improvement of (150-1).

Milk: very little consumed except for a recent tendency to take to condensed milk. Burmans get on very well without. Very difficult to keep babies alive when not breast fed (159-160) 62706-10.

Municipalities run their own hospitals with financial grants from district boards and provincial revenues, under technical supervision of Inspector General of Civil Hospitals (162-3) 62744-9.

Provincial Public Health Board: distributes grants; has a non-official majority (160) 62713-4.

Public Health Act: does not exist but is necessary (164) 62769-70. Should leave wide powers of discretion to district councils (165-7) 62787-98.

Public Health Institution opened last year (163) 62753-5; Finance Committee approved full-time officer (164) 62772.

Publicity: Hygiene publicity officer produces pamphlets, cinema films, etc. (157) 62668-9. Posters issued do not frighten people (164) 62763. Non-official assistance (165) 62785. Importance of education (165-6) 62787-94.

Public opinion: great awakening as to public health in recent years (163) 62756-8; has been stimulated by grant of local self-government (164) 62775. Importance of education on public health matters (165-6) 62787-94.

Punjabi compared with Burman as to physique; not much difference, both good; considerable immigration of Punjabis into Burma. Comparison of diets (160) 62715-20.

Quinine. (*See under that title under* **WELFARE OF RURAL POPULATION**).

Rats: Large number in houses; religious prejudice against killing (147); compared with China and Japan (165) 62780-4. Burman hut offers facilities to rats; slight alternation in design would make a great difference (150); methods of storing rice (151); (167) 62799.

Reclamation schemes in the Delta by pumping silt will improve public health (163-4), 62761-2.

Research: necessary (152); on diet at Public Health Institution (163) 62753-5.

Rice: Beri-beri not alone due to eating polished rice; very little polished rice eaten (158) 62684-9 Fish nearly always eaten with rice (159) 62700-3, 62708. Disagrees with Col. McCarrison as to nutritive value of rice (160) 62719. Unpolished better than polished (167) 62810-4.

Rubbish disposal should be dealt with by circle boards and village committees (150).

Sanitary Inspectors: one required for each circle, total 287 (148-9).

Schools (*see under* Children *above*).

JOLLY, MAJOR G. G.—*concld.*

WELFARE OF RURAL POPULATION—*concld.*

Specific diseases, e.g., leprosy and venereal diseases, measures directed against should follow provision of adequate health service (151-2).
Sub-Assistant Surgeons: 20 employed at present; 4 years training in the Government Medical School in Rangoon; pay starts at Rs. 100 and Rs. 150 (158-9) 62695-9. In charge of dispensaries; have not much time to do health work (162) 62734-7.
Subsidised practitioners not used for public health work; under Inspector General of Civil Hospitals (157) 62672-3.
Surveys, economic and health, in villages, of great value (152).
Vaccination, no prejudice against (165) 62781; an exception to the general principle of dealing with public health before individual treatment (151).
Villages, lay-out, badly planned (150).
Wells and tanks should be protected against contamination. Engineering Branch of Public Health Department must be strengthened (150).
Women: Lady doctors in larger hospitals, not in dispensaries. Except in bigger centres, no special provision for women's diseases. Not sufficient trained midwives (162) 62738-42.

JUAR (*see under* FODDER *under* **ANIMAL HUSBANDRY** and **CROPS AND CROP PROTECTION**).

KALA-AZAR (*see under* **WELFARE OF RURAL POPULATION**).

LAC (*see under* **AGRICULTURAL INDUSTRIES**).

LAND MORTGAGE BANKS (*see under* **CO-OPERATION** and **FINANCE**).

LAND REVENUE.

Pitch of assessment (*Dunn*) (101) 61971-80.

LAND TENURE.

Absentee landlordism retards seed distribution in Pegu (*Maung, etc.*) (176).
Colonisation co-operative societies (*see under* **CO-OPERATION**).
Government estates (*McKerral*) (54) 61528.
Government Estates Department, a model landlord, land leased to tenants (*Dunn*) (94) 61883-8.
Indians not displacing Burmese (*McKerral*) (48) 61441-3.
Leases, yearly, rent in produce; system detrimental (*McKerral*) (?9) 61284-92.
Manure, use of, discouraged by tenancy at will system (*McKerral*) (34) 61213-5; (*Dunn*) (87) 61832-4, (96) 61906-7, (103) 61997-9.
Rent: of rice land in Insein District, 15 baskets of paddy per acre, owner paying Revenue (*Pan, etc.*) (204) 63148-9.
Sharing tenants: on good land, owner takes half, in other cases two-fifths (*Gyi, etc.*) (403) 64901-7.
Yearly tenancy system, discourages use of manure (*Dunn*) (87) 61832-4, (96) 61906-7, (103) 61997-9; (*McKerral*) (34) 61213-5.

LATHYRISM (*see under* **WELFARE OF RURAL POPULATION**).

LATRINES (*see under* **WELFARE OF RURAL POPULATION**).

MALARIA (*see under* **WELFARE OF RURAL POPULATION**).

MANDALAY AGRICULTURAL COLLEGE AND RESEARCH INSTITUTE (*see under* EDUCATION).

MANURES (*see under* **FERTILISERS**).

MARKETING.

BASKET FOR MEASURING PADDY :

Is gradually becoming standardised (*Dun*) (377) 64782-7 ; varying size does not lead to cultivator getting less than he ought to (*Dun*) (377) 64795 ; uniformity should be legally enforced (*McKerral*) (36) 61241-2 ; standardisation would be great benefit (*Pan, etc.*) (202-3) 63107-16 ; should be uniform (*Gyi, etc.*) (401) 64866-7 ; in the jungle much larger than at the mills (224-5), (227) 63378, (228) 63387-94.

Basket for measuring groundnut (*Edwards and Nelson*) (230) 63430.

Brokers : Receive Rs. 2 on 100 baskets of paddy (*Dun*) (377) 64788 ; favour sellers from whom they receive brokerage in preference to buyers (*Dun*) (378) 64800-3 ; at Rangoon are also traders (*Edwards and Nelson*) (224).

Bullinger system : by which big millers manipulate paddy market in a way highly detrimental to cultivators ; should be prohibited by law (*Pan, etc.*) (198). A pooling system by which competition among buyers is eliminated (200) 63060. European merchants buy 75 per cent of rice for export (204) 63135-40.

Centralised exchange not possible (*McKerral*) (28) 61121-2.

Chettyars press for repayment of loans when paddy prices low, which adversely affects paddy market (*Pan, etc.*) (198).

Co-operation (*see* Sale Societies *under* **CO-OPERATION**).

COTTON :

Adulteration : leaf, particularly if showers during harvest ; not much dust (*Edwards and Nelson*) (232) 63454-5.

Credit given on growing crop (*Edwards and Nelson*) (225).

Export : mainly to Japan, but some to Liverpool and Culcutta (*Edwards and Nelson*) (232) 63450.

Improvement of variety : not much scope for (*Edwards and Nelson*) (229) 63417-20 ; quality between Bengals and Oomras (232) 63451 ; (233) 63474-6.

Ginning factories buy through brokers from jungle traders (*Edwards and Nelson*) (225).

Jungle traders usually agents for ginning factories ; if independent, often resort to malpractices (*Edwards and Nelson*) (225-6).

Mixing (*Edwards and Nelson*) (233) 63471-3.

Open markets, unsuccessful attempt to establish in Upper Burma (*Edwards and Nelson*) (230) 63423-5.

Regulation required (*McKerral*) (29) 61125-8.

Season : October-November picking (*Edwards and Nelson*) (232) 63452-3.

Seed, pure, distribution : no organised system ; cultivators buy from ginning factories : unsatisfactory (*Edwards and Nelson*) (226) ; commercial assistance should be given to Government Department (232-3) 63462-4 ; control by ginneries (233) 63466-70.

Weights and Measures : in villages stone weights which vary slightly (*Edwards and Nelson*) (226).

Cultivator suffering from complicated system (*McKerral*) (28) 61116-8 ; from unevenness and irregularity of methods (*Hendry*) (58) 61552-3 ; no Demand for better methods (*Hendry*) (58) 61554.

Education the method of improving conditions (*Hendry*) (58) 61555 ; (*McKerral*) (28) 61119-20.

Facilities, unsatisfactory (*Shwe, etc.*) (385) ; (*Pan, etc.*) (198).

Foreign merchants, Burmans should be put in direct touch with ; cultivators only get one-third of price paid by foreign merchants (*Shwe, etc.*) (385).

Foreign trade, development of, would raise price of agricultural produce to indigenous consumers (*Pan, etc.*) (194).

Forward sales of crops before harvest is detrimental to producers ; remedy is to supply cultivators with funds (*Shwe, etc.*) (385).

Government banks should make loans to cultivators (*Pan, etc.*) (198).

GROUNDNUT :

Basket : standard of measure (*Edwards and Nelson*) (230) 63430.

Central marketing more than with kapas ; very small portion purchased in the jungle by brokers (*Edwards and Nelson*) (226).

Committee should be set up representing dealers and millers, Agricultural Department, distributors, to teach cultivators need of market and regulate practice (*Edwards and Nelson*) (228) 63395-7, (231) 63436.

MARKETING—*contd.*

GROUNDNUT—*contd.*

Crop reports, inaccuracy of (*Edwards and Nelson*) (227), (228-9) 63402-4, (236-7) 63531-41.
Growing crop sold at low price (*Edwards and Nelson*) (226).
Improvement of variety; scope for (*Edwards and Nelson*) (230) 63429.
Magwe market, description by Government officials of unfair treatment of cultivators, inaccurate (*Edwards and Nelson*) (230-1) 63430.
Oil used for ghi (*Edwards and Nelson*) (230) 63428.
Open markets advocated (*Edwards and Nelson*) (231) 63431.
Seed: cultivator keeps his own (*Edwards and Nelson*) (226).
Supply and demand: competition among buyers for local consumption very keen; demand greater than supply (*Edwards and Nelson*) (226), (230) 63426-7.
Unhusked when marketed (*Edwards and Nelson*) (226); recent development, small crop, not exported (230) 63426-7.
Weights and Measures: sale should be by weight (*Edwards and Nelson*) (231) 63430-2; weighment by neutral tallymen not practical (231) 63433.
(*See under* **CROPS AND CROP PROTECTION**).
Information as to market conditions, etc., should be placed at disposal of cultivators (*Pan*, etc.) (194), by Burmese newspapers and broadcasting in English and Burmese (199); (*Shwe, etc.*) (385); (*Gyi, etc.*) (399).

MIDDLEMEN:

Make excessive profits (*Shwe, etc.*) (385); cultivators only get one-third of price paid by foreign merchants (*Shwe, etc.*) (385); illustration: Rs. 175 paid by mills for 100 baskets of paddy for which cultivator received Rs. 100 (*Gyi, etc.*) (399); store paddy from various cultivators and mix it (*Dun*) (377) 64796-7; a difficulty in the way of improving quality (*Hendry*) (64) 61641-2.
Open market: under present circumstances impossible (*Dun*) (377-8) 64798-9.
Premium price for quality rice: importance of cultivator receiving to encourage him to grow better qualities (*Dun*) (377) 64793-4. (*See under* RICE *below*).
Prices of agricultural produce, high (*Pan, etc.*) (194).

RICE:

Adulteration, common (*Edwards and Nelson*) (225).
Basket for measuring paddy: (*see under that title above*).
Bran: exported to England and Germany (235) 63500-1; export cess would not affect price in Burma (235) 63502.
Brokers (*see under that title above*).
in Clutches of big millers who manipulate market (*Pan, etc.*) (198).
Committee should be set up representing dealers and millers, Agricultural Department, distributors and cultivators, to teach cultivator needs of the market and regulate practice (*Edwards and Nelson*) (228) 63395-7.
Direct sale by cultivators to mills encouraged (*Edwards and Nelson*) (236) 63518-9.
Elevators: cannot be used for rice but can for paddy (*Edwards and Nelson*) (229) 63405-6.
Export: principally to Germany and Holland (*Edwards and Nelson*) (234) 63492-3; for starch for industrial purposes (236) 63523-8.
Export duties (*see under* **TARIFFS AND SEA FREIGHTS**).
Facilities satisfactory (*Edwards and Nelson*) (224).
Middlemen: a difficulty in the way of improving quality (*Hendry*) (64) 61641-2. (*See under* MIDDLEMEN *above*).
Mixing of different grades (*Edwards and Nelson*) (227-8) 63386; importance of uniformity (229) 63409, (231) 63440-1; gets mixed on the way from field to mill (235) 63513-7.
Over-production, possibility of (*Edwards and Nelson*) (234) 63492-7.
Premia paid for selected white grain, especially from seed supplied by Agricultural Department (*Edwards and Nelson*) (225); do not always reach cultivators (227) 63379-86; Rs. 20 the highest premium (234) 63486-91; (*Tun, etc.*) (213-4) 63225-40; (*Dun*) (377) 64793-4.
Storage for higher price (*Edwards and Nelson*) (236) 63520-2.
Transport: by cart in bulk, by rail in gunnies, by boat in bulk (*Edwards and Nelson*) (225); higher rates for rice than for paddy (236) 63529-30.

MARKETING—*concld.*

RICE—*contd.*

Wape system: cultivator takes seed on credit and repays with share of crop at a very low price (*Edwards and Nelson*) (234) 63479-80.
Roads, village: lack of, compels cultivators to sell produce cheaply locally (*Gyi, etc.*) (396) network required (*Jevons*) (271-2) 63867-8.
(*See under* TRANSPORT *under* **ADMINISTRATION**).
Surveys very important (*McKerral*) (29) 61129-30.
Tax collectors, try to complete Revenue collection before end of March, and exact payment regardless of hardship to cultivators; collection should be postponed till end of June (*Pan, etc.*) (198).
Timber, depends upon transport; but prices too low to make railways and roads profitable (*Hopwood*) (122) 62309-11. (*See under* **FORESTS.**)

MAUNG, U BA, Honorary Organiser, Einme; **AUNG, U TUN**, Chairman, Muden Co-operative Society; **MAUNG, U BA**, Manager, the Pegu Central Co-operative Bank, Ltd.; and **ROMEZ, Mr.**, Manager of a Tenant Co-partnership Society. (169-190).

ADMINISTRATION:

Railway, Pegu Kayan, not much use to co-operative colony (186) 62964-6.
Services (Agricultural, Veterinary, Transport, Meteorological, Posts and Telegraphs) satisfactory (171).
Staff, scientific, of Government of India should be increased (171).

AGRICULTURAL IMPLEMENTS:

Agents for sale of, necessary (177).
Demonstrations necessary (176).
Theikpan plough, an improvement of the indigenous plough, introduced by Agricultural Department, is inexpensive and saves time and labour (176-7).

AGRICULTURAL INDEBTEDNESS:

Causes of borrowing: crop failure, high prices, high wages and absconding labourers (171), payment of rent in advance (173).
Control of credit of cultivators advocated (171).
Debt: Ancestral, considerable (182) 62887-9. Increasing with value of land. Cultivators not ashamed of being in debt (182) 62887-93, (188) 62992-5.
Measures to relieve agriculture's burden of debt: fixing interest and wages, and binding labourers so as to prevent loss to cultivators (171). Legislation prohibiting excessive interest, of which public must be informed; non-liability to attachment for debt of implements, etc. (174).
Moneylenders: not driven away by co-operation (182) 62894-7, (186) 62954-63.
Repayment prevented by: high interest and expenses of paddy land (171), (173).
Sources of credit: local wealthy persons and chetties (171); and co-operative credit societies (173).

AGRICULTURAL LABOUR:

Wages: high; should be fixed by law and labourers should be bound so as to prevent loss to cultivators (171).

ANIMAL HUSBANDRY:

Pathways, lack of, to grazing grounds (169).

CO-OPERATION:

Adult education, an opening for societies (181) 62869-70.
Audit, cost should be borne by Government (185) 62940-9.
Colonisation societies: land leased from Government, allotted by committee; Government advanced money, but not enough, leading to resort to moneylenders; a success; 82 such societies at present; Yitkangyi Colony (184-5) 62920-39. Pegu Kayan Railway not of much use to Colony (186) 62964-6. No improved methods of cultivation used (186-7) 62974-9. Land belongs to Government (189) 63017-9.
Credit societies: weaknesses of (177); should be put in order before starting selling societies (181) 62865-6. Reserves (181-2) 62882-6.

MAUNG, U BA, AUNG, U TUN, MAUNG, U BA and ROMEZ, Mr.—*contd.*

CO-OPERATION—*contd.*

Debt: priority should be given to that owing to societies and imprisonment for debt due to private individuals should be abolished (172).

Department, officers of (except Registrar) should act merely as propagandists and instructors (174). Relations with non-officials good (187) 62989-91. Staff, inadequate (177).

Deposits: mainly from public. Under Act III of 1923, local bodies can deposit their funds with the Central Banks approved by Local Government, but so far Government have refused sanction (188) 63003-10. Could be obtained from public at lower interest if Government made loans to societies (188) 62011-6.

Education: co-operative training schools should be opened at expense of Government (177); has not been neglected (178) 62824.

Einme Township Bank: majority of shares held by societies; dividend limited to 8 per cent; in giving loans acts upon reports of Junior Assistant Registrars and auditors; no delay in dealing with applications; bad communications, roads, etc., sometimes prevent repayment by societies; no societies independent of Central Bank (183) 62901-17. Capital about Rs. 3,000; 4 or 5 societies members; 7 societies members of union; established 9 years; audits societies (186) 62967-73. Honorary organiser appointed by Deputy Commissioner (190) 62035-8.

Fragmented holdings, societies for aggregation of, do not exist (178).

Government loans should be made through co-operative societies (172), (177).

Health improvement work in rural parts not done by societies who do not consider it their work (189-190) 63022-34.

Improvement societies should be tried where there are fisheries and canals (177-8).

Industrial societies should be financed by Government (177).

Interest: rates paid by and to co-operative societies should be controlled by Government (172-3). Rural credit societies charge 15 per cent to members and pay the Bank 10 per cent, while moneylenders charge from 24 to 60 per cent. Rate charged to cultivators should not be increased (180-1) 62846-62, (181-2) 62874-86, (186) 62954-63.

Joint farming societies do not exist but should be introduced where credit societies are successful (178).

Labour societies for contract work should be formed (178).

Land mortgage banks: should be merged in Central Banks (177).

Liability, unlimited: is understood by members; has not been enforced yet (183) 62898-900.

Liquidation of societies caused by crop failure owing to flood and drought (178-9) 62824-5.

Litigation, Government servants should give assistance to societies engaged in (174-5).

Long term loans: necessity of. Government should provide funds at first (175) at 5 per cent per annum (176); careful supervision necessary (179) 62825-32, (181) 62863-4.

Land mortgage banks should be merged in Central Banks (177).

Machinery agricultural: societies for co-operative use of, do not exist but would be useful (178).

Meetings: of most societies properly conducted; 90 per cent attendance of members at annual meetings of primary societies (179-80) 62833-45.

Members: average per society 50 in Pegu District (179) 62835-7.

Moneylenders: have not been driven away by credit societies (182) 62894-7, (186) 62954-63.

Non-officials: Honorary organisers, instruction of (172), (187) 62984-8; travelling expenses should be borne by Government (177). Inefficiency of control by (183-4) 62918-9. Intimate association necessary between officers of Department and members of societies (172-3), (174). Relations good (187) 62989-91. Non-officials have not sufficient spare time (188) 62996-63002. Honorary organiser of Einme Township Bank appointed by Deputy Commissioner (190) 63035-8.

Objects of societies achieved to a small extent (173); not yet achieved (175).

Purchase societies: failure of, generally but a successful society among police in Pegu District (177).

Recognition, greater, of societies, necessary (174).

Registrar, Junior Assistant, one should be appointed by Government in every district (172).

Reputation of movement not damaged (181) 62872-3; Government loan would improve prestige of co-operative banks (188-9) 63011-6.

Sale societies, complete failure of (177).

Seed distribution, help given by societies (181) 62867-8, (185) 62950.

MAUNG, U BA, AUNG, U TUN, MAUNG, U BA AND ROMEZ, MR.—*contd.*

CO-OPERATION—*contd.*

Supervision, official: premature withdrawal of, cause of present disappointing condition of movement (178) 62820-3. (183-4) 62918-9; not caused by political non-co-operation movement (187) 62980-3. Non-officials had not sufficient spare time (188) 62996-63002. Government supervision necessary (189) 63016; removed in 1921; movement desired it should be removed (190) 63039-43.
Supreme association, non-officials being in majority on controlling board, subsidised by Government, should be formed (174-5).
Tenants' societies should be formed and given leases of land (177).
Thrift, Burman has no sense of (188) 62992.

CROPS AND CROP PROTECTION:

Seed distribution: Absentee landlordism retards in Pegu (176). Of paddy seed partly unsuccessful owing to unsuitability (170); help of co-operative societies (181) 62867-8.

DEMONSTRATION AND PROPAGANDA:

Field demonstrations on paddy land (170-1); more necessary (176).
of Improved implements, necessary (173-7).
Paddy seed: distribution of; partly unsuccessful owing to unsuitability (170); great benefit resulting from demonstration of pure seed (176).

EDUCATION:

Adult: libraries necessary (170); co-operative societies should help (181) 62869-70.
Agricultural: should be taught in all educational institutions (170); schools should be established in every important agricultural district (175).
Attendance suffers from lack of employment for educated persons (170).
Co-operation: training schools should be opened at the expense of Government (177).
Fees, none should be charged for children at school (170).
Institutions, insufficient (169).
Pupils: drawn mainly from agricultural classes (170); those who have studied agriculture are employed in the Agricultural Department; none carry on agriculture on their own account (170).
School plots should be allotted to every school (170).
Tax, educational, should be levied locally and paid to teacher, not as regular salary but by way of rewards (170).
Teachers: supply insufficient. Should have knowledge of co-operative account-keeping and science of agriculture (169). Should not receive a regular salary but should receive rewards (170).

FERTILISERS:

Cost, a deterring factor (176).
Demonstration necessary (172), (176).
Farmyard manure, the only inexpensive fertiliser (176).
Increased use of manures on high paddy land (172).

FINANCE:

Chetty; charges 24 per cent per annum for seasonal loans (181) 62874-81.
Government should lend to cultivators on mortgage (171).
Taccavi should be given only where no co-operative society can be formed; necessity of publicity (173).

IRRIGATION:

Distribution of canal-water, method satisfactory (172).
Excess of water in Irrawaddy Division (171).
Tanks should be provided (171).
Wells should be provided (171).

MAUNG, U BA, AUNG, U TUN, MAUNG, U BA AND ROMEZ, Mr.—*concld.*

LAND TENURE :

Absentee landlordism retards seed distribution in Pegu (176).
Colonisation co-operative societies : *see under* **CO-OPERATION.**

RESEARCH :

Funds, lack of, retards progress (169).
Laboratories, insufficient (169).
Seeds, grain : wishes of people should be ascertained (169).
Workers, skilled, required (169).

SOILS :

Bund construction : embankments leading to flooding on higher lands should be prohibited (169), (172), (185) 62951-3.
Reclamation of land : by drainage (189) 63020-1. By construction of bunds, by Government (172).

VETERINARY :

Assistants should be under control of circle boards (172).
Department should be under Director of Agriculture (172).
Dispensaries : District boards, should not be under control of (172).
Use of, by agriculturists, not full (172).
Inspector should be under control of district board (172).

WELFARE OF RURAL POPULATION :

Co-operative societies not giving medical assistance ; not considered to be part of their work (189) 63024-33.
Quinine : no distribution of (189) 63023-4 ; people appreciate value of (190) 63034.
Sanitation in villages (189) 63022.

MAUNG, U KHIN (witness) (*see under* **TUN, U PAW.** *etc.*)

McKERRAL A., M.A., B.SC., I.A.S., Director of Agriculture, Burma (1—55). Past experience and appointments : (15).

ADMINISTRATION :

Agricultural Adviser : should be Administrative Head of Department (50) 61469-70.
——————— connection with Burma (50) 61464-8.
——————— should be liaison officer between Central and Provincial Departments (5).
——————— should be secretary to Government (5).
——————— separation of duties of, from those of Director of Pusa advocated (5).
Board of Agriculture should be maintained as a purely advisory body (14).
Central Agricultural Department : Advantages derived by Burma from research under Central Government (37) 61250-62.
——————— Contributions to the Provinces should not be made (48) 61444-9.
——————— Control, none, over Provincial Departments ; American federal system probably the best model (4), (13), (31-2) 61163-75 ; Australian experience (21) 60992-3.
——————— Provincial stations for crops of All-India importance (5), (21) 60983-9.
——————— Recruitment to, suggestion (4).
Central Agricultural Research Committee, Proposals for :
——————— Advisory to Pusa (21-2) 60993-4.
——————— Central Cotton Committee should be absorbed (14), (35) 61223-30.
——————— Functions would be mainly administrative (14), (15), (45) 61375.

McKERRAL, A.—*contd.*

ADMINISTRATION—*contd.*

Central Agricultural Research Committee, Proposals for :—*contd.*

——————— Fund, special, for financing research should be provided by an acre cess and not export cess (14), (22) 61001-3; not technically land revenue (49) 61451-62.

——————— Meeting annually (44) 61374.

——————— Representatives of Central and Provincial Departments and Chambers of Commerce (14), (32) 61178-83.

——————— Sub-committees for different subjects (41) 61322.

——————— Tea Association Station, difficulty in absorbing (35) 61225-30.

Cess on the export of rice (49) 61450.

Committee of departments concerned with rural betterment required (6).

Committee for agricultural improvement, five started (42) 61325-7, (50) 61472-4.

Conferences, not sufficient in number (32) 61176-7.

Director-General of Central Research, proposal *re* appointment of, and duties (15)

Pusa Research Institute : Central Research Committee would advise (22) 60993-5.

——————— Director should be distinct from Agricultural Adviser (5)

——————— Extension to agricultural engineering, horticulture, economics and statistics, and enlarged botany section, proposal (4).

——————— Post-graduate training (44) 61371-3.

——————— Prestige should be restored (5); has fallen greatly (22) 60996-8, (43) 61343-5, (50) 61463-4; has fallen relatively (55) 61538-9.

Superior Provincial Agricultural Service, no announcement as to (23) 61017-8.

Transport : Arakan and Tenasserim require increased facilities (6), (34) 61208-10.

——————— Motor, popular (23) 61031-2.

——————— Prices of agricultural produce, effect upon (54) 61519-22.

——————— Railways insufficient (6), (23) 61028-30. Shan States, increased cultivation in, with increased railways (34) 61210.

——————— Steamers, Burma very well catered for by Irrawaddy Flotilla Company (7).

AGRICULTURAL DEPARTMENT :

Agricultural College, Mandalay (16) 60905.

Budget, small cuts (55) 61533.

Committees for agricultural improvement, five started (42) 61325-7, (50) 61472-4.

Demonstrators : mostly graduates of Poona Agricultural College and have practical knowledge (16) 60910-3.

Deputy Directors : when appointed have not sufficient knowledge of plant breeding (17-8) 60928-35; control experimental farms and district work (42) 61331-2; in touch with village life (47) 61411-2.

Distribution of activities, fair as between demonstration and research (16) 60914-5; sufficient attention given to Lower Burma wet area and dry area of the mid-zone, but not much to Northern area (17) 60923-7; not much assistance given to planters (22) 61004-9.

District farms for experiment (16) 60906.

Engineers, agricultural, to be added to cadre of Superior Provincial Service (30) 61143-6.

Forestry Department : does not come much into touch with (28) 61114-5.

Indebtedness, not immediately concerned with (46) 61398-402.

Legislative Council : friendly attitude of (42) 61339-40; (55) 61543-7.

Peripatetic demonstrators : two senior agricultural assistants for each district (16) 60908-9.

Personnel (16) 60905.

Sericultural Section, four senior assistants and four fieldmen (16) 60905.

Staff : insufficient in subordinate grades; increased pay necessary (5), (22) 60999-61000; insufficient correlation with other departments (5); short term appointments inadvisable (21) 60990-1; promotion from subordinate service (30) 61151-3, (42) 61328; training abroad (42) 61328-30; vacancies to be filled by short term agreements (42) 61337-8; method of recruitment in England (43) 61346-8.

McKERRAL, A.—*contd.*

AGRICULTURAL DEPARTMENT—*contd.*

Superior Provincial Agricultural Service, no announcement as to (23) 61017-8.
Tenasserim: planting problems, an experimental farm in, department not in touch with quinine growing (22-3) 61010-4.

AGRICULTURAL INDEBTEDNESS:

Agricultural Department not immediately concerned with (46) 61398-402.
Important factor in relation to agricultural progress (23) 61025-7.
Thrift, advantages of, not appreciated (13); (53) 61504-10.

AGRICULTURAL INDUSTRIES:

Bee-keeping, objected to by Buddhists (11).
Carting in slack season (11).
Cutch boiling in slack season (11).
Fruit: growing hampered by theft and low prices (11); canning, nothing done by Government (52-3) 61503.
Fuel cutting in slack season (11).
Ghi-making in Sagaing District, probably originated by Indians (10).
—— vegetable, or margarine, not used in Burma (52) 61502.
Government could not do more than private enterprise has done (11); better without Government aid (52-3) 61498-503.
Industrial concerns: are set up in rural areas (12).
———— Intensive study of each rural industry would be useful; industrial inefficiency (12).
———— Rural wages affected by (19) 60963-6.
Lac culture, unprofitable on the plains (11).
Leisure period varying (11).
Mat making in slack season (11).
Oil pressing: Cotton seed all used for oil extraction or sowing (11); mills, European and Japanese (33) 61200-2. Soap making in Rangoon (52) 61501.
Poultry rearing, objected to by Buddhists (11).
Rice straw: paper making and industrial alcohol not tried (11).
Rope making: cultivators make ropes for their own use (11).
Sericulture, objected to by Buddhists (11).
Thatch making in slack season (11).
Wheat (very small area); straw used for cattle food (11).

AGRICULTURAL LABOUR.

Migration of labour to rice fields from Madras and Upper Burma (48) 61439-40. No displacement of Burmese by Indians (48) 61441-3.

ANIMAL HUSBANDRY:

Buffalo: as a draft animal unpopular (26) 61082-5; numbers stationary and decreasing in proportion to bullocks (38) 61263-5.
Castration: no attempt made to encourage (27) 61103-5, (28) 61109-13. People have no prejudice against (36) 61243.
Cattlebreeding: no control exercised over (27) 61103-5. Deterioration owing to crossing (28) 61109-13, (34) 61217. Government stock breeding farm opened but nothing done yet (41) 61313-4. Under the Agricultural Department (41) 61320-1.
Condensed milk: imports of the value of 41 lakhs of rupees for the year 1925-26 (10), (27) 61098-102.
Dairying: none except at Sagaing (10).
———— insanitary conditions (11).
Deputy Director of Live Stock Breeding proposed (26) 61078-80.
Draft: animals to pull heavier loads required (10); in the dry middle tract (20-1) 60977-82.
——— More important than milk (26) 61081, (27) 61096.
Fodder: Insufficiency of (11); in the dry middle tract (20-1) 60978-80.
——— Numbers of cattle should be limited (11).
——— Paddy straw should be more carefully conserved (11).

McKERRAL, A.—*contd.*

ANIMAL HUSBANDRY—*contd.*

Fodder, Silo : experiments successful but not adopted by cultivators (27) 61091-7.
———, Storage (33) 61191-9.
Goats are pests (26-7) 61086-9.
Import of cattle from Indian Peninsula should be stopped or controlled (10), (27) 61090. Trade not large (33) 61189-90.
Numbers of livestock (11), (55) 61534-7.
Pastures : generally over-stocked (11).
———— cattle, sheep and goats kept by parasitic Indians paying no land revenue (11) ; compulsory registration and castration advocated (28) 61109-13.
Rinderpest : serious : 100,000 deaths in some years (27-8) 61106-8.
Sheep are pests (26-7) 61086-8.

BURMA VILLAGE ACT :

Gives power to District Officers to deal with cattle disease (10) ; forbids villagers to live on their holdings, but is now in this respect a dead letter (46) 61397 ; enacted to prevent crime (52) 61497.

CAPITAL, ATTRACTING OF, TO AGRICULTURE :

Improvements, factors tending to discourage (13).
Land, a popular form of investment (12).
Large estates, formation of, leads to absentee landlordism or to capitalist enterprise and formation of large landless class (12), (35) 61231-2.
Thrift, advantages of, not appreciated (13), (53) 61504-10.

CO-OPERATION :

Adult education, an important instrument for (29) 61137.
Agricultural Department not directly concerned with (46) 61398-410.
Colonisation Department, now Government Estates Department (48) 61432-3.
Financial Commissioner for Transferred Subjects to co-ordinate Co-operative and Agricultural Departments (46-7) 61398-426.
Seed distribution, help given to Agricultural Department (25) 61061-2.
Success, lack of (29) 61133-6.
Taluka development associations compared with Agricultural improvement committees (50-1) 61472-9.

CROPS AND CROP PROTECTION :

Cinchona plantations under Government of India (55) 61532.
Cotton, Cambodia, area small but increasing (8).
———, Seed, germination percentage low : (42) 61325.
———, Selected, premiums given for (8).
———, Value as a money crop (20) 60969-72.
Destructive Insects and Pests Act, 1914, probably necessary to revise to protect Burma from pests from India (9) ; should be done as soon as possible (26) 61073-5 ; by system of certificates (36) 61246-9.
Fodder : many new crops tried but failed (8).
Gram, improved : increased yield 5 lakhs of rupees per annum (8).
Groundnuts, introduced during the last 20 years and covering 400,000 acres (8); oil extraction in India, oil and cake exported (40) 61300-3.
Improvement : Agricultural Department attempting to improve rice, cotton, beans, gram, chillies, groundnuts, sesamum, tobacco and juar ; all crops capable of improvement (8).
Juar : best fodder crops in the dry zone (8) ; liable to fungus attack (8).
New crops, introduction of, not hopeful (8).
Pemyit, leguminous, roots and pods food crop, in irrigated rice areas of Upper Burma (8).
Peseinsa, leguminous, root food crop, Lower Burma and alluvial tracts (8).
Potato cultivation increased in Shan States owing to Scotch seed and extension of railway (4), (19) 60967-8, (34) 61210.
Rangoon bean, important commercially (8).
Rice, Burma supplies 63 per cent of Western world's requirements ; quality not inferior (43-4) 61355-8.

McKERRAL, A.—*contd.*

CROPS AND CROP PROTECTION—*contd.*

Rice: Diseases, remedy burning stubble (38) 61281-3.
——: Flood-resisting varieties (55) 61529-31.
——: Heaviest yielding food crop (8).
——: Premium given for improved variety (8).
——: Quality and quantity (40) 61304-7.
——: Seed, demand greater than supply; help of co-operative societies; private seed growers (25-6) 61060-9.
——: Yield not decreasing (45) 61378-81; (52) 61493-4.
Rubber, introduced during the last 20 years; 79,437 acres (8); not much assistance from Agricultural Department (22) 61004-9.
Seeds, distribution of, by Government, not private agency (8).
Tapioca (cassava), increased area (8).
Wild animals, damage caused by, comparatively insignificant (8).

CULTIVATION:

Agricultural improvement committees, five started (42) 61325-7; informal (45) 61390-4.
Cotton, difficulty of introducing row-sowing instead of broadcasting (9).
Culturable waste: 20 million acres; most would be unprofitable to work (48) 61427-35. Rate of increase of area cultivated diminishing (54) 61523-7.
District Councils take no interest in agricultural matters (45) 61395-6.
Improved methods, introduction of, not very successful (9).
Middle tract, shortage of moisture a limiting factor; green manuring (20-1) 60973-82.
Sugarcane, economies can be effected (9).

DEMONSTRATION AND PROPAGANDA:

on Cultivators' own fields, the best method (3), (19) 60962; use of Ammo-phos (7).
Demonstrators, mostly graduates of Poona Agricultural College and have practical knowledge (16) 60910-3.
Distribution of activities, fair, between demonstration and research (16) 60914-5.
Farms, special demonstration, subject to criticism (3); but necessary in special circumstances (31) 61161.
Gram, substitution of immune variety (4).
Groundnut, cultivation increased from nothing to over 400,000 acres in 20 years; cotton ginning factories could deal with groundnut (4).
Peripatetic lecturing (3).
Potato cultivation increased in Shan States owing to Scotch seed and extension of railway (4), (19) 60967-8, (34) 61210.
Rice, spread of improved varieties (4).
Short courses for cultivators at central farms (3).
Shows, cattle or produce (3), held every year (17) 60916-7.
Successes, due to filling market need and giving immediate profit (4).

DEVELOPMENT COMMISSIONER:

Now called Financial Commissioner for Transferred Subjects (47) 61413-4; to co-ordinate Agricultural, Veterinary and Co-operative Departments, an awkward arrangement (6); had no control over Education, Public Health or Irrigation (47) 61413-22. Board should be substituted (47) 61423-6.

EDUCATION:

Adult education in rural tracts by farm schools and continuation schools: teaching 9 months, touring and demonstrating 3 months, suggestion (3), (12).
Cost (31) 61157-60, (33) 61202-7.
Cultivators at Agricultural Department central farms (2), (18) 60946-53, (19) 60959-61.
Stipends of Rs. 20 per month (36) 61238-40.
Students: go back to the land; some the scum of the village (40) 61308-12.
Agricultural education, Importance of (29) 61131-2.
——————, Value educational rather than vocational (54) 61516-8.

McKERRAL, A.—*contd.*

EDUCATION—*contd.*

Agricultural College, Mandalay: mainly training staff for Agricultural Department (2); personnel (16) 60905, (17) 60918-9; no post-graduate training (23) 61019-21, (44) 61371. Research discussed by College Council and Conference (42) 61349-53. Agricultural economics taught (44) 61361. Not affiliated to University of Rangoon owing to refusal to give 4-years' course (53) 61511-4.
Buddhist monastery schools, teaching meagre (3), (12).
Estate managers, no demand for (23) 61015-6.
Incentive to study agriculture: Government service only (3), (19) 60954-5.
Mechanics, no demand for tuition (19) 60963.
Nature study useful in developing intelligence, but not of direct vocational value (3); work not well done (19) 60956-8.
Pusa Research Institute should give post-graduate training (44) 61371-3.
Pyinmana Middle School, of American Baptist Mission, subsidised by Government: at present an experiment (2), (51) 61480-4; no other agricultural school (54) 61515.
School farms expensive and useless (3).
School plots useful in developing intelligence but not of direct vocational value (3).
Subsidy of schools by Government (51) 61480-4.

FERTILISERS:

Ammo-phos: controlled demonstrations carried out on cultivators' own fields (7); profitable (8); imported from America, for paddy, cultivators not using it (39) 61293-5.
Artificial farmyard manure made at Hmawbi, but not profitable (7), (33) 61187-8.
Calcium cyanamide, on swamp rice, inferior to sulphate of ammonia (7).
Cattle manure: Fuel, use of, as, not practised (7).
———— Lost on waste grazing land (7), (40) 61297-9.
———— Nurseries, only enough for (7), (39) 61296-7.
———— Tenancy-at-will system discourages use of (7), (34) 61213-5.
Fish, not used (29) 61138-9.
Guano, bat's, along Shan Hills; small quantities available (7).
Legislation to deal with fraudulent adulteration (7).
Lime of good quality found in abundance (7).
Night soil, not used (30) 61140-2.
Nitrates, poisonous to swamp rice (7).
Nitrogen and phosphates, the limiting factors in Lower Burma rice soils (25) 61057-9.
Potash has no appreciable effect on swamp rice (7).
Prawn dust, small quantities exported from Lower Burma to the Straits (7).
Prices of artificial fertilisers coming down and of rice going up (8); finance required (24) 61035.
Research, sufficient (7).
Sulphate of ammonia combined with phosphates increased rice yield up to 40 per cent but not profitable (7), (26) 61070-2.

FINANCE:

Government loans under Agriculturists' Loans Act and Land Improvement Loans Act unpopular (35-6) 61233-4.
Long-term loans necessary for improvements (24) 61033-8.

FINANCIAL COMMISSIONER FOR TRANSFERRED SUBJECTS:

Co-ordinates work of certain departments (46) 61398-413.

FORESTS:

Agricultural Department does not come into touch with Forestry Department (28) 61114-5.
Teak (25) 61056.
Variety of timbers, great (18) 60941.

HOLDINGS:

Fragmentation: very little except in Arakan (24) 61039-40.
Indians not displacing Burmese (48) 61441-3.

McKERRAL, A.—*contd.*

IMPLEMENTS:

Agricultural Department has designed: ploughshare for Burmese plough body, screw water lift with windmill, seed drill, improved furnace for jaggery (9-10), (30) 61143-50, (51) 61485-7.
Expert, whole time, required (10).
Manufacture of ploughshares locally (51-2) 61488-92.
Plough: for paddy apparently succeeding (9).
——— in the dry zone for cotton and groundnut (36) 61235.
Requirements: light enough for bullocks, cheap, to be adjusted and repaired locally (9).
Small implements, considerable scope for (36) 61235-7.
Tractors, threshers and other heavy machinery too expensive and difficult to transport (9).

IRRIGATION:

Irrawaddy, proposal to bund at neck of Delta to save silt (24-5) 61045-8, (34) 61216.
Wells, country not suitable for (24) 61036-8, (52) 61495-6.

LAND TENURE:

Government estates (54) 61528.
Indians not displacing Burmese (48) 61441-3.
Leases, yearly, rent in produce; system detrimental (39) 61284-92.
Manure, use of, discouraged by tenancy-at-will system (34) 61213-5.

MARKETING:

Basket, uniform, should be legally enforced (36) 61241-2.
Centralised exchange not possible (28) 61121-2.
Co-operative marketing, very little (28) 61122-4.
Cotton, regulation required (29) 61125-8.
Cultivator suffering from complicated system (28) 61116-8.
Education of cultivator the remedy (28) 61119-20.
Surveys very important (29) 61129-30.

RESEARCH:

Agricultural College, Mandalay: soils, plant breeding and other crop problems; work co-ordinated by Principal (1); College Council and Conference (43) 61349-53.
Central Government, advantages derived by Burma from research under (37) 61250-62.
Cotton, research required (44) 61364-8.
Experimental farms of Agricultural Department: rotation, tillage methods, adaptability of new crops, manures and plant breeding (1).
Fertilisers, artificial, research done (7).
Lines of research suggested: economic value of wild plants, cold storage of fruits (2), (18) 60937-40; insect attack on board ship (2), (18) 60942-5, curing tobacco, horticulture (2).
Plant breeding: Deputy Directors do most of the work (2); but when appointed have not sufficient knowledge of the subject (17-8) 60928-35.
——————— Planting industry should pay for research by export duty on rubber (2).
Records of experiments satisfactory (23) 61022-4.
Rice: four stations experimenting (43-4) 61354-60.
—— Burma's problem is rice (44) 61367-8. Coimbatore in touch with (44) 61369-70.
Rotations, no new, worked out yet (44) 61362.
Teaching duties take up of much of time of research officers; strong assistant teaching staff required (2).
Veterinary: none.
———————, College at Insein to be opened (2), (17) 60920-2, (18) 60936.
———————, Provincial institutions required (10), (30-1) 61154-6.

SOILS:

Alkaline land, no large tracts (25) 61050.
Delta soils not uniform (25) 61052.

McKERRAL, A.—*concld.*

SOIL—*contd.*

Deterioration due to constant cropping without manure (7).
Erosion due to deforestation following shifting cultivation in Shan Hills (25) §1053-6.
Nitrogen and phosphates the limiting factors in Lower Burma rice soils (25) 61057-9.
Silt waste in Irrawaddy (24) 61041-8, (32) 61184-6.
Survey (25) 61051; by agricultural chemist (45) 61382-9.
Virgin jungle, most of paddy area of South Burma reclaimed from, within the last 70 years (7).
Waterlogging (25) 61049, (38) 61266-70.

STATISTICS:

Methods satisfactory (30) 61147.
Settlement Officer's reports contain full descriptions of agricultural conditions and practice (38) 61271-5.

VETERINARY:

Cattlebreeding is under the Agricultural Department (41) 61320-1.
Contagious diseases: Burma Village Act gives power to District Officers (10).
———, Frontier staff should be strengthened (10).
Dispensaries, four, not much demand (10).
Elephant, importance of (31) 61156, (34) 61211-2.
Research: none yet; College at Insein to be opened (2), (17) 60920-2, (18) 60936.
——— Provincial institutions required (10), (30-1) 61154-6.
Rinderpest: serious, 100,000 deaths in some years (27-8) 61106-8; inoculation becoming more popular (41) 61318-9.
Serum: Difficulty in obtaining (10).
———, Institute for preparation in Burma advocated (10); Committee in 1924 rejected this proposal (41) 61315.
Veterinary Department: Agricultural Department, should be independent of (10), (26) 61076-7.
——— Progress made (41) 61316-7.
——— Under-staffed in superior grades, insufficient correlation with other departments (5).

WATER HYACINTH:

Not so serious in Burma as in other Provinces (42) 61333-6.

WELFARE OF RURAL POPULATION:

Deputy Commissioners, some take an interest in agriculture and welfare (55) 61540-2.
Improvement in condition of people (45) 61376-7.
Malaria at Minbu in Upper Burma (36) 61244-5.
Surveys: Marketing, stockbreeding and cocoanuts (43) 61341-2.
———, Typical villages, not advocated (13); but reports prepared by Punjab Board of Economics very valuable (34-5) 61218-22.

METEOROLOGICAL DEPARTMENT (*see under* **ADMINISTRATION**).

MIDDLE CLASS (*see under* **EDUCATION**).

MILK (*see under* **WELFARE OF RURAL POPULATION**).

MONEYLENDERS (*see under* **AGRICULTURAL INDEBTEDNESS**).

MORTGAGES (*see under* **AGRICULTURAL INDEBTEDNESS**).

NATURE STUDY (*see under* **EDUCATION**).

NELSON, J. J. (witness) (*see under* **EDWARDS, E. L.** *and* **NELSON, J. J.**)

NYUN, U (witness) (*see under* **SHWE, etc.**).

PAN, SAYA, Agriculturist, Ainggale Village, Tantabin Township, Insein District; **GALE, U MAUNG**, Agriculturist, Pegu District; **TUN, U**, Representative of the Burma Chamber of Commerce; and **HAN, U PO**, of Messrs. U Po Han & Co., Rangoon, dealers in machinery. Representative agriculturists from Lower Burma (190-205).

ADMINISTRATION:

Agricultural Department, services of (191), (195).
Meteorological Department: unsatisfactory: reports should be published in all vernacular newspapers and by radio (196).
Posts and Telegraphs: satisfactory (191), extremely unsatisfactory (196).
Transport: Railways and steamers satisfactory (191); insufficient (196).
————, Roads: bridges necessary (191); insufficient; money wasted on motor roads instead of being spent on village roads (196).
Veterinary Department: inadequate (190-1); not in close touch with cultivators (195).
Wireless: can be of great service to agriculturists (196).

AGRICULTURAL DEPARTMENT:

Ammonium sulphate, good effect upon paddy nurseries demonstrated (192).
Education, agricultural, should be left to Department (191).
Services of, satisfactory (191).
Staff: for research adequate (190).
————, Junior Officers should be recruited from cultivating classes (205) 63164-6.

AGRICULTURAL INDEBTEDNESS:

Buddhist religious desire to repay loans (196), (200) 63061.
Causes of borrowing: high cost of living and floods (191); lack of means, crop failures, disease, human and animal, high interest, thriftlessness and gambling (196).
Chettyars press for repayment when paddy prices low (198).
Control of cultivators' credit by limiting mortgage and sale advocated (191); not advocated (196).
Insolvency: Court relief would make indebtedness worse (196).
———— Attachment of plough cattle for debt, common (204) 63153-4.
Measures to lighten agriculture's burden of debt: protection against flood, long-term loans, low interest (191); Insolvency Court will make indebtedness worse (196).
Repayment, prevented by: crop failure due to floods and high interest (191); disease, human and animal, thriftlessness and gambling (196).
Sources of credit: chetties, Government and moneylenders (191), (196).
Usurious Loans Act, should be applied with discrimination (196).

AGRICULTURAL INDUSTRIES:

Bags and packing, manufacture may be established with Government aid (198).
Basket making: practised all over Insein District (193); may be established with Government aid; obstacle is lack of knowledge (198).
Bee-keeping, religious objection (193), (198).
Employment, rural, can be increased by irrigation enabling more than one crop to be raised per year (198).
Fruit: scarcity of land an obstacle (193); difficulty of transport and pests (198).
Industrial concerns in rural areas would give subsidiary employment to rural population (193).
Lac: religious objection (193), (198).
Leisure period: in Insein District, field work 10 months in the year and carting fuel, bamboo, etc., during the remaining 2 months; cultivators have no spare time but labourers may take up subsidiary industries (193). On the average, cultivator works about half the year and amuses himself during the other half (197).
Mats, straw, manufacture may be established with Government aid (198).
Oil pressing: Government should help to establish (193).
Preparation of agricultural produce for consumption, Government should help to establish industries connected with (193); on cottage scale (198).
Pisciculture: religious objection (198).
Poultry rearing, religious objection (198).
Rice, making starch and flour, may be established with Government aid (198).
Rope making: practised all over Insein District (193); from straw, may be established with Government aid. Obstacle is want of knowledge (198).

AGRICULTURAL INDUSTRIES—*contd.*

Sericulture: religious objection (193), (198).
Spinning, may be established with Government aid (198).
Straw: mats, bags and packing, ropes, boards, pulpware; manufactures may be established with Government aid (198).
Study of rural industries necessary, with a view to introducing improved tools and appliances (193), (198).
Sugar-making: Government should help to establish (193).
Weaving: may be established with Government aid (198).

AGRICULTURAL LABOUR:

Attraction of, by allotment of cultivable land, advocated (193).
Colonisation schemes advocated to develop areas not at present under cultivation (194).
Immigration from Indian Peninsula during reaping season, might be reduced by one-third if gambling ceased (194).
Public Works Department and district councils might employ cultivators during the slack season (198).
Shortage: not appreciable; due to gambling (194); labour-saving machinery the remedy (198).
Unemployment, a cause of the increase of crime (198).
Wages, for harvesting rice, in kind, in paddy (204) 63152.

ANIMAL HUSBANDRY:

Dairying, of doubtful benefit (193).
Draught oxen; satisfactory in Insein District. 4 yokes required to plough 53 acres (201) 63075-85. 8 yokes to plough 100 acres (204) 63141-4.
Fodder: in Insein District sufficient grass and paddy straw; kaing grass available in dry seasons in lowland areas. Scarcity may exist for 4 weeks (192-3), (201) 63084. Plenty in Lower Burma (197). In Pegu District shortage during working season; paddy straw stored but grass more nourishing (201-2) 63084-91.
Grazing: Enclosed pastures, none (193); absence of, not source of injury to cattle (197).
———, Over-stocking of common pastures, not cause of injury to cattle (197).
———, Sufficient (193).
Milk, supply in large towns unsatisfactory; Government or co-operative societies should undertake (197), (201) 63067.
Mineral constituents, no injury to cattle through lack of (197).

CAPITAL, ATTRACTING OF, TO AGRICULTURE:

Attracting capital to agriculture is impossible (195).
Exemption from rates and taxes and Government loans should be given to encourage enterprising Burmans to cultivate land by machinery (199).
Government estates, present policy with regard to formation of, objectionable (199).
Improvements of agricultural lands by owners prevented by ignorance (195); want of funds, knowledge of power farming machinery and help from district officials (199).

CO-OPERATION:

Credit societies, present demoralisation of, calls for strong Government action (194).
Implements, should be distributed by Government or co-operative societies at cost price and by easy instalments (197).
Machinery, agricultural, societies for use of: cultivators not in a position to utilise (194).
Milk supply in large towns extremely unsatisfactory; Government or co-operative societies should undertake (197).
Minority should not be compelled to come into schemes for joint improvement (194).
Objects, societies have not achieved (194).
Sale societies: present conditions discouraging; Government help needed (194); should store produce in godowns and make advances upon it (198).

CO-OPERATION—*contd.*

Seed, pure : societies for joint growing of pure strains and selling direct to millers, successful. Premia of 10 to 15 per cent paid by millers for improved paddy (191). Distribution should be to societies and not to individuals, to avoid mixing (191), (194).

CROPS AND CROP PROTECTION :

Fodder : in Insein District not extensively put down (192).
———, Saccoline in Upper Burma (192).
Improvement of crops, none (197).
New crops, introduction of : very little headway (197).
Outturn : 750 baskets of paddy from 100 acres (204) 63151.
Rice, improved, produced by Agricultural Department, better outturn and prices (192) ; sometimes cultivator does not share in improved price (202) 63092-6.
Seed, pure, distribution : societies for joint growing of pure seed and selling direct to millers, successful ; premia paid by millers for improved paddy (191) ; but floods during last 5 years (192) ; unsatisfactory ; should be distributed from township headquarters and advertised (197).
Wild animals, no damage by (192).

CULTIVATION :

Outturn : 750 baskets of paddy from 100 acres (204) 63151.
Plough, hire of, costs 75 baskets of paddy per yoke (204) 63150.
Rotation : none in Insein District, paddy being the only crop (192). Propaganda as to, by leaflets, cinema, broadcasting and demonstrations, advocated (197).
Theikpan plough designed by Agricultural Department, improved tillage by (192).
Tillage : not much done to improve (192) ; very little improvement can be made (197).
Tractors : use of, prevented by lack of capital ; Government should assist (197).

DEMONSTRATION AND PROPAGANDA.

Agricultural education : propaganda necessary to induce lads to study (190), (191) ; on Cultivators' own plots, comparative demonstrations of improved and mixed seeds (191) ; of fertilisers (192), (197) ; and improved implements (192). Demonstrations on Department's land, regardless of expenditure, worse than useless (195), (200) 63058-9, (205) 63166.
Distribution of pure seed to individual cultivators fails owing to mixing ; to societies will be successful (191), (195).
Expert advice, cultivators may be induced to adopt (195).

EDUCATION :

Adult : should be popularised by demonstration that profits are increased by improved methods (191).
Agricultural bias, in rural areas, advocated (194).
Agricultural : No institutions for, in the districts (190) ; boys of agricultural classes only have time to learn to read and write (191) ; should form part of rural education (191) ; should be left to Agricultural Department and financed by Government (191) ; schools, urgent need for (195) ; boys should attend at about 15 years of age (200) 63052-7 ; existing system bad (199), (201) 63068-70.
Attendance up to 4th class adversely affected by lack of practical agricultural value of teaching (194).
Compulsory primary education advocated, conditionally (203) 63121-5.
Demand for agricultural education should be stimulated by use of Burmese language and proving economic advantage (195).
Elementary : standard too low to benefit cultivators appreciably (194).
English, education in, wanted if not expensive (203) 63125-30.
Higher, not needed by agriculturists (194).
Mandalay Agricultural College and Research Institute sufficient for agricultural education (190) ; insufficient, a white elephant (195) ; schools more necessary (200) 63048-54.
Middle class youths : demonstrations in the field necessary to show advantages of studying agriculture (191) ; should be enabled to develop waste land, with financial aid if necessary (195).

PAN, SAYA, GALE, U MAUNG, TUN, U *and* HAN, U PO.—*contd.*

EDUCATION—*contd.*

Nature study : should be practical (191) ; advocated in all schools (195).
Practical work, as much as possible should be introduced in connection with nature study, school plots and farms (191).
Propaganda necessary to induce youths to study agriculture (190).
Rural, should consist mainly of the three R's (199).
Secondary : facilities for, should exist in rural areas (194).
School farms : should be practical (191) ; advocated in all schools (195).
School plots : should be practical (191) ; advocated in all schools (195).
Students, majority who have studied agriculture are serving in Agricultural Department (191).
Teachers : in rural areas, should be drawn from agricultural classes (190).
Teaching facilities, urgent need for extension in all districts (190).

FERTILISERS :

Adulteration, difficult to prevent (196).
Ammonium sulphate, good effect on paddy nurseries demonstrated by Agricultural Department (192).
Artificial, not so profitable as natural manures (196) ; and expensive (203) 63117-20.
Cowdung, use of, as fuel, only by a few Indians (192), (197).
Demonstration : on cultivator's plots necessary (192), (197).
Green manuring profitable with mechanical power (196).
Reclamation of land by use of fertilisers (192).
Silting : profitable with mechanical power (196) ; in delta lands by sluices (200-1) 63062-6.

FINANCE :

Implements : Government should make loans for purchase of " Case " power farming machinery (199).
Land mortgage banks : should be established by Government ; should give loans at low interest and easy repayment (196).
Long term loans essential (191) ; for improved implements, *e.g.*, tractors (197).
Marketing : Government should make loans to cultivators on easy terms (198).

FORESTS :

Afforestation schemes in neighbourhood of villages would be detrimental to villagers in regard to their grazing (194).
Erosion due to deforestation : difficulty of preventing (194).
Extraction of wood for fuel and implements by cultivators should be permitted without license (194).

HOLDINGS :

Consolidation : prevented by customs of inheritance and lack of spirit of co-operation (192).
Fragmentation : a custom ; to interfere with would be against wishes of cultivators (192).

IMPLEMENTS :

" Case " power farming machinery, the best (199) ; for dry land ; cannot be used on wet, muddy land (202) 63099-106, (204-5) 63155-9. Seven tractors sold (205) 63160-3.
Competitions should be held (197).
Demonstration : on cultivators' fields, has been successful (192), (197) ; " Case " dealers are prepared to give demonstrations (199).
Distribution : not widespread ; should be at cost price on easy instalments by Government or co-operative societies (197) ; loans should be made by Government to cultivators for the purchase of complete sets of " Case " power farming machinery, costing Rs. 4,810, to be repaid in two years (199).
Long term loans advocated (197).
Manufacturers' lack of knowledge of local conditions, an obstacle (197).
Middlemen's profits raise price above means of cultivator (197).
Theikpan plough : has become very popular (192) ; one ploughshare can be used instead of two, saves time, surface and composition of soil are made even (204) 63145-7.

PAN, SAYA, GALE, U MAUNG, TUN, U *and* HAN, U PO—*contd.*

IRRIGATION :

Floods (191-2).

LAND TENURE :

Rent : of rice land in Insein District, 15 baskets of paddy per acre, owner paying revenue (204) 63148-9.

MARKETING :

Basket : rice sold by baskets which vary in size ; standardisation would be great benefit (202-3) 63107-16.

Bullinger system : by which big millers manipulate paddy market in a way highly detrimental to cultivators, should be prohibited by law (198). A pooling system by which competition among buyers is eliminated (200) 63060. European merchants buy 75 per cent of rice for export (204) 63135-40.

Chettyars press for repayment of loans when paddy prices low, which adversely affects paddy market (198).

Co-operative sale societies, with godowns, should make advances upon produce stored (198).

Facilities, not satisfactory (198).

Foreign trade, development of, would raise price of agricultural produce to indigenous consumers (194).

Government banks should make loans to cultivators (198).

Information as to market conditions, etc., should be placed at disposal of cultivators (194) ; by Burmese newspapers and broadcasting in English and Burmese (199).

Prices of agricultural produce, high (194).

Rice : Improved strains should gradually replace present inferior varieties (194).

—— In clutches of big millers who manipulate market (198).

Tax collectors, try to complete Revenue collection before end of March, and exact payment regardless of hardship to cultivators ; collection should be postponed till end of June (198).

RESEARCH :

Indigenous theory and traditional methods of agriculture should be main line of research (190).

Staff of Agricultural Department adequate ; slow progress (190).

Veterinary, insufficient (190) ; provincial veterinary research institute advocated (193).

SOILS :

Clay, black, yield very heavy if sufficient rainwater (192).

Floods, serious for five years in Insein, Tharrawaddy, Hanthawaddy and Maubin (191).

Reclamation ; by fertilisers (192) ; by Government aid (196) ; by silting (200-1) 63062-6.

Sandy soils deteriorating (192).

STATISTICS :

Agricultural, arrangement and publication of, of no value (195).

of Livestock and implements, of doubtful practical value (195).

VETERINARY :

Department, inadequate (190-1).

Dispensaries : Insufficient under district boards (193).

———— Touring, none in Insein District (193).

———— Use of, by agriculturists, not full (193).

Inoculation, no fees charged (193).

Research : insufficient (190) ; provincial veterinary research institute advocated (193).

Serum, supply system unsatisfactory (193).

Superior veterinary officer with the Government of India, appointment of, would increase efficiency (193).

PAN, SAYA, GALE, U MAUNG, TUN, U *and* HAN, U PO—*concld.*

WELFARE OF RURAL POPULATION:
Surveys, economic, in typical villages, advocated (195).
Unemployment and poverty causes of increased crime (198).
Usury, the root cause of economic difficulties of cultivators (195).

PAPER (*see under* **AGRICULTURAL INDUSTRIES**).

POPULATION (*see under* **WELFARE OF RURAL POPULATION**).

POSTAL FACILITIES (*see under* **ADMINISTRATION**).

POULTRY KEEPING (*see under* **AGRICULTURAL INDUSTRIES**).

PUBLIC HEALTH (*see under* **WELFARE OF RURAL POPULATION**).

PUSA INSTITUTE (*see under* **RESEARCH**).

QUININE (*see under* **WELFARE OF RURAL POPULATION** *and under* Cinchona *under* **CROPS AND CROP PROTECTION**).

RAILWAYS (*see under* TRANSPORT *under* **ADMINISTRATION**).

RESEARCH.

Agricultural Chemist, Burma, responsible for teaching, research and routine work, unable to leave Mandalay and become really conversant with agricultural problems in various parts of the Province; assistant lecturers should be appointed; Rs. 2,000 travelling expenses allowed (*Charlton*) (279); is also at present Principal of Mandalay Agricultural College and Agricultural Engineer (283) 63929-34, (287) 63997-9, (288) 64027-8; is not Member of Board or Faculties of University of Rangoon (288) 64031.

Agricultural Engineer: Agricultural Chemist and Principal of Mandalay College at present acting as (*Charlton*) (283) 63933; a very important post; holder has resigned and assistant offered his resignation; should be on the superior establishment (295-6) 64144-54.

Bee-keeping: No work being done; staff should be appointed (*Ghosh*) (298). (*See under* **AGRICULTURAL INDUSTRIES**).

Central Government, advantages derived by Burma from research under (*McKerral*) (37) 61250-62.

Chaulmoogra oil for leprosy (*Hopwood*) (123) 62326-7.

Commercial representation advocated (*Edwards* and *Nelson*) (232) 63457-61; financial contribution from merchants (234) 63485-91.

Co-ordination of central and provincial research: very little; Pusa might co-ordinate work of Provinces; inspection would not be helpful but conferences might (*Charlton*) (287-8) 64000-15.

Cotton, research required (*McKerral*) (44) 61364-8.

Dehra Dun Research Institute, has proved of value, with a view to finding market for agricultural products and increasing employment (*Hopwood*) (120) 62270-2.

Director-General of Research: proposal regarding appointment of, and duties (*McKerral*) (15).

Entomology: agricultural, dealing with crop pests should be centralised, with sufficient staff to cover Provinces in co-operation with Indian Museum (*Ghosh*) (298), (334-5) 64293-302, (338) 64359-62, (339).

———— Systematic, should be confined to the Indian Museum (*Ghosh*) (298), (330) 64198-200, (334-5) 64293-302. At present museums at Pusa, Dehra Dun and Coimbatore (337-8) 64358, (339).

Equipment for, equal to any in India (*Charlton*) (293) 64107-9.

Experimental farms of Agricultural Department: rotation, tillage methods, adaptability of new crops, manures and plant breeding (*McKerral*) (1).

Fertilisers, artificial, research done (*McKerral*) (7); (*Hendry*) (56-7); experiments carried out fairly thoroughly (58) 61549-50, (62) 61616.

Fish: (*Jolly*) (163) 62753-5.

Foreign experts should be encouraged to spend holidays in India (*Tun, etc.*) (205), (220-1) 63329-31.

RESEARCH—*contd.*

Funds, lack of, retards progress (*Maung, etc.*) (169).
Indigenous theory and traditional methods of agriculture should be main line of research (*Pan, etc.*) (190).
Insectary, lack of at Mandalay (*Charlton*) (279), (284) 63958-9.
Irrawaddy River: sufficient known as to silt and scouring action (*Stuart*) (251) 63611.
Laboratories, insufficient (*Maung, etc.*) (169).
Lines of research suggested: economic value of wild plants; cold storage of fruits (*McKerral*) (2), (18) 60937-40; insect attack on board ship (2), (18) 60942-5; curing tobacco, horticulture (2).
Mandalay Agricultural College, Mandalay: soils, plant breeding and other crop problems; work co-ordinated by Principal (*McKerral*) (1); College Council and Conference (43) 61349-53.
Millers: do not contribute financially (*Hendry*) (66) 61675-6. Organisation of committee advisable (66) 61677-9.
Pests, research necessary (*Tun, etc.*) (205).
Plant breeding: Deputy Directors do most of the work (*McKerral*) (2); but when appointed have not sufficient knowledge of the subject (17-8) 60928-35. Planting industry should pay for research by export duty on rubber (2).
Plant diseases (*Charlton*) (289) 64038-42.

PUSA RESEARCH INSTITUTE:

proposed Central Research Committee would advise (*McKerral*) (22) 60993-5.
Contact with (*Charlton*) (287-8) 64000-15, (293) 64107-9.
Criticism of (*Ghosh*) (329-30) 64192-200, (334-5) 64293-302, (339.)
Director should be distinct from Agricultural Adviser (*McKerral*) (5).
Extension to include agricultural engineering, horticulture, economics and statistics, and enlarged botany section (*McKerral*) (4).
Post-graduate training (*McKerral*) (44) 61371-3.
Prestige should be restored (*McKerral*) (5); has fallen greatly (22) 60996-8, (43) 61343-5, (50) 61463-4; has fallen relatively (55) 61538-9.
Records of experiments satisfactory (*McKerral*) (23) 61022-4.

RICE:

Burma's problem is rice (*McKerral*) (44) 61367-8. Coimbatore in touch with (44) 61369-70
Four stations experimenting (*McKerral*) (43-4) 61354-60.
Hybridisation (*Hendry*) (59) 61567, (62) 61617-8, (64) 61643-4.
Improvement (*Hendry*) (65) 61654-5. (*See under* **CROPS AND CROP PROTECTION** *and under* **MARKETING.**)
Rotations, no new, worked out yet (*McKerral*) (44) 61362.
Seeds, grain: wishes of people should be ascertained (*Maung, etc.*) (169). (*See* SEED DISTRIBUTION *under* **CROPS AND CROP PROTECTION**).
Soils (*see under that heading.*)
Staff of Agricultural Department adequate; slow progress (*Pan, etc.*) (190); (*Hendry*) (62) 61619-21.
Sugarcane at Hmawbi Farm (*Hendry*) (63) 61631-3.
Teaching, elementary: association with, does not assist research (*Charlton*) (285) 63964-5.
Teaching duties take up much of time of research officers; strong assistant teaching staff required (*McKerral*) (2).
Veterinary (*see* Research *under* **VETERINARY**).
Weeds: (*Charlton*) (289) 64038-42.
Welfare of Rural Population (*see* Research *under that heading*).
Workers, skilled, required (*Maung, etc.*) (169).

RICE (*see above, and under*) **CROPS AND CROP PROTECTION, MARKETING, TARIFFS AND SEA FREIGHTS,** *and* **WELFARE OF RURAL POPULATION).**

RINDERPEST (*see under* **VETERINARY**),

RIPPON, CAPT. S. R., M.R.C.V.S., I.V.S., Superintendent, Civil Veterinary Department, Burma, in charge of South-Eastern and South-Western Circles, Rangoon (126-33.)

ADMINISTRATION :

District Councils responsible for maintenance of veterinary dispensaries, Assistants paid out of Provincial funds ; system does not work well (126).
Veterinary Department should be independent (126) ; but at present under Agricultural Department (127) 62362-5.

ANIMAL HUSBANDRY :

Castrations, a few at Insein Veterinary College but none in the districts : by the Italian method (128) 62396-9.
Cattle-breeding entirely under the Agricultural Department (128) 62382 ; in the dry zone. Burmese bullocks a definite type. Indian cattle roam about the road-sides (130-1) 62414-20, 62430-8.
Cross-breeding, local cattle with English bulls (130) 62421.
Horse-breeding transferred to Military Police (128) 62383-5.
Trade, transfrontier : ponies, mules and cattle used (130) 62427-9.

EDUCATION :

Insein Veterinary College (*see under* **VETERINARY**).

VETERINARY :

Agricultural Adviser with the Government of India not a veterinarian (127).
Calcutta Veterinary College, staff receive a stipend while training (131) 62439-41.
Castrations, a few at Insein Veterinary School but none in the districts : by the Italian method (128) 62396-9.
Cattle-breeding entirely under Agricultural Department (128) 62382. Agricultural Committee of 1925 recommended that breeding should be done by Veterinary Department and distribution by Agricultural Department ; could not be done with present staff (132) 62461-2. No Advisory Committee though recommended by Agricultural Committee (132) 62463-4.
Contagious diseases : Difficulties in dealing with (126) ; legislation necessary (126). Cattle Disease Rules, 1914 (127) 62369-70 ; Policing necessary (127) 62370-2 ; system of reporting adequate but not carried out properly (132) 62457-60.
Department should be independent (126) ; is at present under Agricultural Department (127) 62362-5.
Dispensaries :
District Council responsible for maintenance while Assistants in charge paid out of Provincial funds ; system does not work well (126) ; should be provincialised (127) 62366-8, (131-2) 62448-56 ; municipalities asked to contribute (133) 62491-6.
Equipment should be improved (126).
Expansion not adequate (126).
Preme, average of 2 animals treated daily (126).
Provincial authority, control should be transferred to (126).
Touring dispensaries, full use not made of (126), (133) 62485-6.
Use of, by agriculturists, not full (126).
Elephant diseases, no investigation of (130) 62425 6 ; high mortality through anthrax, etc. ; research officer sanctioned but not yet appointed (133) 62487-90.
Horse-breeding transferred to Military Police (128) 62383-5.
Inoculation, no fee charged except to municipalities and wealthy owners (126) ; obstacles to popularising (126).
Insein Veterinary School (*see under* **VETERINARY**).
Research : further facilities desirable (126) ; no officers at present engaged on (131) 62445-6. Provincial institutions advocated as well as Muktesar (126), (128) 62378-81.
Rinderpest : serum-simultaneous inoculation (127) 62373-4.
Serum : occasional difficulty in obtaining (126) ; station for manufacturing in Burma (128) 62375-7 ; would be very expensive (133) 62478-84.
Superior Provincial Veterinary Service to be trained at Insein ; must take a very long time (128) 62386-95.
Superior Veterinary Officer with the Government of India should be appointed (127).
Veterinary Assistants : pay, which is inadequate, has been revised (130) 62422-3 ; false statements of touring expenses (130) 62424.

ROBERTSON, H. F., B.Sc., I.A.S. Professor of Agriculture, Mandalay Agricultural College; was Deputy Director of Agriculture, Myingyan Circle, Meiktila. (340-50) Experience in Burma since 1921 (343) 64371-4.

AGRICULTURAL DEPARTMENT:

Myingyan Circle: interest taken by cultivators; farmers' associations organised (348-9) 64474-8.
Staff: trained labourer cultivators should be permanently appointed for demonstration (340); in Myingyan Circle (348) 64459-62.

AGRICULTURAL LABOUR:

Roads, improved, and migration of labour (350) 64497-9.

ANIMAL HUSBANDRY:

Breeding of, cattle: very little control exercised (345) 64396-7.
————Indian blood: investigation of effect of slight admixture necessary (342); better milk, size and weight (346)64421-2; introduces inferior strain but not disease (348) 64469-70.
————Profits favourable (343), (346) 64425. Selection within Burmese breeds advocated (342); give 7 lb. milk a day (346) 64417-24. Shows advocated (343).
Dairying: Not usual owing to Burman religious objection (342).
Fodder:
Green: Serious effect of almost total absence of, during dry season (343).
Hay is made (345) 64389-9.
Insufficient for breeding cattle (343).
Jowar: damaged by pest "Pwinbyu" (*striga lutea*); methods of resisting (343) is stored (345) 64400-2.
Manuring advocated (343).
Season of great shortage: March-May (343).
Silo, pit, advocated (343); has never known a cultivator to dig one (345) 64403-4
Well-irrigated grass advocated (343).
Grazing:
No enclosed pastures (343).
Shortage, serious effects of (342).
Plough Cattle: mainly Burmese; first cross with Indian not good (346) 64417-20; treated better than breeding cattle (343) 64425-9.

CO-OPERATION:

Payitkon, in Lower Chindwin, successful purchase-society (340-1).
Purchase and sale societies, advocated (340-1).

CROPS AND CROP PROTECTION:

Cotton: climate difficulty of spreading improved strain in dry tract (344) 64376. (*See under* seed *below*). Requires deep ploughing (345-6) 64405-13.
Gram, Karachi, introduction in Upper Burma a great success (348) 64471-5.
Groundnut, introduction in dry tract has increased prosperity (343-4) 64374-5; no rotation (347-8) 64455-8.
Pests: "Pwinbyu" (*striga lutea*) damaging jowar fodder; remedies (343).
———— Smut on jowar, copper sulphate used (340), (348) 64463-6.
Seed: Cotton cultivators' difficulty in getting high prices charged by local ginners; average price Rs. 5 to Rs. 7 early in the season to Rs. 17 later; some seed extremely bad germination; setting up of Government ginneries not advisable; regulations insisting on standard of germination; hand ginning a retrograde step (349-50) 64482-96.

CULTIVATION:

Drill sowing recommended (342).
Dry tract, extreme uncertainty of season (343-4) 64374-85; 30 ins. of rainfall in 6 months; local plough, implements used; mixed cultivation: groundnut and pigeon pea, sowed broadcast; in proper groundnut tracts no rotation (347-8) 64448-58.

ROBERTSON, H. F.—*contd.*

CULTIVATION—*contd.*

Inter-cultivating recommended (342).
Line sowing recommended (342).
Theikpan ploughs recommended (342).

DEMONSTRATION AND PROPAGANDA :

Copper sulphate, demand for, as anti-smut treatment of jowar, as the result of free demonstration issue (340), (348) 64463-6.
Expert advice, cultivators should be induced to adopt, by best-holding competitions with prizes (340), as has been done in Myingyan Circle (344) 64379-81; cultivator willing to adopt (345) 64393-5, (348-9) 64474-8.
Farms, Government experimental, have little effect (340).
Improvements of holdings might be financed by Government (340); under existing Acts (344) 64382-5.
Leaflets, lecture, lantern slides, should follow demonstration on cultivators' fields (340).
Manures, natural, demonstration of storing, etc., necessary (342).
On cultivators' fields, under ordinary conditions, the only successful method (340).
Staff: trained labourer cultivators should be permanently appointed for demonstration (340); in Myingyan Circle (348) 64459-62.
Theikpan plough shares, great demand for, as the result of practical demonstration (340).

FERTILISERS :

Natural manures, greater use of, the only thing that can be done at present (341); demonstration of storing, etc., necessary (342).

FINANCE :

Improvement, land, loans, careful extension of, advocated (341).
Payitkon, in Lower Chindwin, successful purchase co-operative society (340-1).
Purchase and sale co-operative societies, advocated (340-1).
Taccavi: does not reach poorest; growing crops might be accepted as security. Difficulty and trouble is applying for. Advances in kind after a bad season; danger of too facile credit (341).

IMPLEMENTS :

Chaff-cutting machines used in dry zones (347) 64445.
Cultivators: not unduly conservative in use of improved implements (347) 64445-7.
Distribution, should be by local traders after popularisation by Agricultural Department (342); local traders would require 25 per cent profit (346-7) 64430-40.
Improved: requirements: seed-drill, harrows, inter-cultivator, implements for collecting cotton and jowar roots, and for harvesting groundnuts (342), (347) 64441-4; in dry tract (347) 64449, (348) 64467-8, (349) 64481.
Price of imported implements the main difficulty; payment by instalment advocated (342).
Seed-drill: improvement of, requires investigation (342); leaves a furrow which heavy rain fills with soil and seed does not come up; cross-harrowing suggested (346) 64414-6.
Theikpan plough advocated (340), (342); combines some advantages of western plough with cheap frame; a little heavier than indigenous plough and goes a little deeper; cotton requires deep ploughing (345-6) 64405-13.

IRRIGATION :

Canals: Surplus water should be applied to *mayin* instead of *kaukgyi* crops (349) 64479-80.
Supervision of construction of small tanks advocated (341); not control but giving advice; an officer should be responsible (344) 64386-91.
Wells, in dry zone: possibilities should be investigated (341); no tube-wells (344) 64377-8. Should be undertaken by Agricultural Engineer (344) 64392.

ROBERTSON, H. F.—*concld.*

SOILS :

Erosion : improved lay-out of holdings, construction of kazins and drains, advocated (341).

ROADS (*see under* TRANSPORT *under* **ADMINISTRATION**).

ROMEZ (witness) (*see under* **MAUNG, U BA** *etc.*).

ROPE-MAKING (*see under* **AGRICULTURAL INDUSTRIES**).

SEA FREIGHTS (*see under* **TARIFFS AND SEA FREIGHTS**).

SEEDS (*see under* **CROPS AND CROP PROTECTION**).

SEIN, U, Manager, The Burma Provincial Co-operative Bank, Ltd., Mandalay : (351-71).

AGRICULTURAL INDEBTEDNESS :

Causes of borrowing : increased cost of living owing to introduction of civilised luxuries (351) ; decreased incomes of cultivators, increased cost of land and labour (352). Net return on capital invested in agriculture 9 per cent ; yet cultivators borrow from chetties at 24 per cent ; rise in value of land has increased credit and so led to increased borrowing (359) 64584-93.

Extent of : eighty per cent of people are seriously indebted and many have become landless tenants ; position has become much worse in the last 10 years (358) 64556-70.

Moneylenders : Co-operators borrow from, at 36 and 60 per cent after crop failures (357-8) 64552-5 ; do not regard co-operative movement as a serious competitor (360) 64601-2 ; live in luxury by exploiting cultivators (367) 64703-6.

Repayment prevented by high interest which exceeds return on capital invested in agriculture (351-2), (358) 64556, (363) 64653-4 (*see under* Standard of living *under* **WELFARE OF RURAL POPULATION**).

Thrift is practised by cultivators (367) 64703-6.

AGRICULTURAL INDUSTRIES :

Co-operative societies for establishing cottage industries should be introduced among housewives (352).

ANIMAL HUSBANDRY :

Breeding cattle : Obstacles of lack of capital and religious prejudice (352), (364-5) 64677-80.

Dairying : No religious objection to using milk, butter, etc., as food (364) 64678.

BURMA VILLAGE ACT :

Restrictions on villagers living on their holdings should be abolished (353-4), (364) 64667-9.

CAPITAL, ATTRACTING OF, TO AGRICULTURE :

Capitalists should not be allowed to take to agriculture ; if they do, small cultivators will become landless tenants (353).

Government should supply capital (353).

Improvement of land by owners prevented by lack of capital (353).

CO-OPERATION :

Audit : Should be done by Government free (368) 64723-4.

Better farming and better living societies : hopeful if agricultural department assist (357) 64550-1.

Burma Provincial Co-operative Bank, Ltd., Mandalay :—

AUDIT : by chartered accountants (357) 64541.

CAPITAL :

Cash position of Bank sound, sufficient fluid resources for a year without repayments from societies (362) 64639-40, (369) 64747-8.

SEIN, U—*contd.*

CO-OPERATION—*contd.*

Burma Provincial Co-operative Bank, Ltd., Mandalay—*contd.*

CAPITAL—*contd.*

European Government servants have subscribed nearly 60 per cent of deposits (356) 64531-3.

Government:

Should provide greater part of capital; this is contrary to co-operative principles but must be done to avert failure (356-7) 64534-9.

Should provide 75 per cent of funds for 30 years unless Land Mortgage Bank is established (359) 64580-3, (368) 64725.

Government securities, 34 lakhs (369) 64742-6, (369) 64742-6.

Loans repayable in 10 years required to build godowns, which Bank cannot make, as its deposits are for four years; Government have been asked to make advances (361-2) 64625-36.

Local deposits, 4½ per cent paid for one year, 8 per cent for 3 years; in future expected to be possible to get all money required on current account at 3 or 2½ per cent, but money at call would be dangerous (360) 64607-10.

Paid-up, over 6 lakhs (355) 64508-11.

Societies have not deposited much money (360) 64603-6.

Working, 130 lakhs (366) 64695.

Conferences, provincial, once in four years (361) 64618.

INTEREST:

Depositors receive 7½ per cent (357) 64539.

Societies cannot work unless the Bank can borrow at 3½ or 4 per cent (358) 64560-1.

Societies pay the Bank 10 per cent (357) 64540.

LOANS:

Arrears can be recovered by liquidator as land revenue, with the approval of the Registrar (361) 64611-3.

Government liable for loans, as loans to primary societies are made on authority of Registrar, who is a Government official (362-3) 64641-4.

solely Guided by department as to loans (356) 64519-21.

Maximum borrowing limit of primary societies fixed by Government officer upon forecasts prepared by committees of management (363) 64649-54.

Outstanding, 85 lakhs of which 30 lakhs is in arrears; financial crisis anticipated next year unless Government help (356) 64522-30.

to Societies, not to individual members (356) 64516-8.

many Written off (356) 64522.

MANAGEMENT:

Directors, fourteen in number, are business men (355) 64512-13; are non-officials (366) 64695.

Manager: whole time salaried (355) 64514-5.

PROFITS:

Accrued entered in books as paid but a reserve created (370) 64760-70.

Margin is difference between 7½ per cent paid to depositors and 10 per cent paid by societies for loans (357) 64539-42.

Treasury should allow Bank to open personal ledger account, to assist checking (370-1) 64771-6.

Cattle-breeding societies: obstacles of lack of capital and religious prejudice (352).

Conferences: district, once a year and provincial, once in four years (previously two years) (361) 64617-20, (369) 64750-6.

Cottage industries societies should be introduced among housewives (352).

Credit societies: unsuccessful owing to high interest, insufficient finance and long-term loans (352); none really successful (353). Committee of management in each society; prepare forecasts, upon which Government officer fixes maximum borrowing limit; Committee sanctions loans to individual members (363) 64649-51; Committees take sufficient interest but societies are unsuccessful because incomes of members are too small for them to make repayments (363) 64652-4 (*see* Standard of living *under* **WELFARE OF RURAL POPULATION**). Audit should be done by Government free (368) 64723-4.

SEIN, U—*contd.*

Co-operation—*contd.*

Discipline: a Burman quality (370) 64757-9.

Education: Should be taught in village lay schools (353), members well educated in principles; should be done mainly by non-officials (359-60) 64590-5.

Fragmented holdings, societies for aggregation of: would not be much use in Burma (352).

Godowns: *see under* Sales societies *below.*

Guaranteeing unions, system unsatisfactory and should be abolished (363) 64645-8.

Government: Should provide funds (351), (368) 64725; at 5 per cent (355) 64500-7; should have entire control (352), (363) 64658-9. Is expected to do everything for the people (362) 64635-6. Should do audit free (368) 64723-4. State bank advocated (368) 64725.

Improvements: societies for affecting, should be tried as to irrigation and drainage (352).

Interest: Banks charge societies 10 per cent; societies charge members 15 per cent; excessive; has ruined societies and will strangle cultivators (351) (*see* Causes of borrowing *under* **AGRICULTURAL INDEBTEDNESS**).

Joint farming societies: premature, difficult problem of unity; should be introduced when Co-operation generally is successfully established (352).

Liquidation: Act gives liquidator, with approval of Registrar, power to recover contributions as arrears of land revenue. Delays in liquidation due to appointment of honorary liquidators. Paid liquidators then appointed and now junior Assistant Registrars (361) 64611-6; official liquidators paid by Government (361) 64622-4.

Local bodies have power to deposit funds in Central Banks, but have not done so owing to opposition by Government (367-8) 64717-22.

Machinery, agricultural, societies for use of, would be advantageous if working with their own money and not with money borrowed from banks (352).

Manure societies: (362) 64634.

Minorities, compulsion to come into schemes of joint improvement (353).

Moneylenders: Members of societies borrow from, at 36 and 60 per cent after crop failure (357-8) 64552-5; do not regard co-operative movement as a serious competitor (360) 64601-2; live in luxury by exploiting cultivators (367) 64703-6.

Non-officials: should do propaganda (352), (363) 64655-7. Objection to exclusion of, from board of control of proposed Land Mortgage Bank. Provincial Bank and Central Banks managed by (366) 64691-7.

Progress: Movement going backwards; enquiry called for (367) 64712-6; due to higher standard of living though Burmans more advanced than in the Indian Peninsula; lack of capital; not due to bad report issued by Registrar which was justified by the facts. Societies in the dry tracts in a very bad way. Education and knowledge of co-operative principles good. Lack of cheap credit. Land mortgage banks will give relief (368-9) 64726-41.

Purchase societies: not many; should be started among members of credit societies, after reformation (352).

Sale societies: should be started among members of credit societies, after reformation; should have godowns, built with their own money or from intact reserve funds of credit societies (352); not speculative (357) 64547-9. Unlucky attempt 8 years ago leading to demoralisation. To build godowns long term loans, repayable in 10 years, necessary; Provincial Bank cannot make such loans; application made to Government (361-2) 64625-33.

Seed societies: (362) 64634.

Supervision, official; withdrawal of, a cause of trouble in co-operative movement (357) 64545-6; witness's changed opinion (361) 64621; Government should have entire control (352), (363) 64658-9.

Crops and Crop Protection:

Groundnut in Pakokku district, has brought in a large amount of money (358) 64570.

Sesamum seed, price increased from Rs. 7 to Rs. 17 (358) 64571-2.

Education:

Agriculture, scientific, should be a subject in village lay schools (353).

SEIN U—*concld.*

EDUCATION—*contd.*

Attendance in fourth class, small proportion due to poverty of parents compelling them to make their children work, and lack of appreciation of education (353).
Compulsory, preferred in rural areas (353); would not involve extra expenditure (362) 64637-8, (364) 64670-6.
Co-operation should be taught in village lay schools (353).
Thrift should be taught in village lay schools (353).

FINANCE:

Land Mortgage Bank: Bill proposes to establish bank independent of co-operative banks; this would adversely affect co-operative banks by draining away their securities. Instead of this, Government should give financial assistance to co-operative societies to replace loans issued for land redemption or purchase; advantages of this proposal. Government advances to societies would start on a small scale increasing to a maximum of 3 crores. Staff of societies efficient to deal with such a large sum and investigation of titles of borrowers. Objection to proposal, in the Bill, of a non-elected board of control (365-6) 64681-97.
State bank advocated (368) 64725.

WELFARE OF RURAL POPULATION:

Crime: caused by poverty (364) 64675.
Homesteads should be on the cultivated holding and not in the village; this will lead to better cultivation, greater care of cattle, improved health of the family, investment of savings in banks instead of in jewellery, etc. (353-4); restrictions should be abolished (364) 64667-9.
Hygiene in villages cannot be improved, there being no drains and cattle being kept near houses (353).
Standard of living: Largest earning of a family after deducting expenses Rs. 20 or Rs. 30, which is insufficient to pay 15 per cent interest on loans. (Adam Smith and Sismondi quoted) (351-2), (355), (364) 64664-6, (366) 64698-711, (368) 64728-33.
Surveys, economic, in typical villages, advocated; statement of scope and method of enquiry (354-5); should be done by mixed official and non-official committees (363-4) 64660-6, (367) 64707-11.

SERICULTURE (*see under* **AGRICULTURAL INDUSTRIES**).

SHWE, U, GALE, U YIN, and NYUN, U, Representatives of Co-operators of Upper Burma. (378-95).

All Union Chairman (394) 64807-8.

ADMINISTRATION:

Services, unsatisfactory, of Agricultural, Veterinary, Meteorological, Posts and Telegraphs Departments, and Transport (380).

AGRICULTURAL INDEBTEDNESS:

Causes of borrowing: lack of capital and having to rent land, failure to prepare estimates of future expenses and profits (380); recklessness and extravagance (387); irregularity of rainfall, insect pests, cattle disease, smallness of income (391).
Mortgages, redemption should be facilitated, and should be cancelled by payment of principal and of interest equal to principal (380).
Repayment, prevented by excess of expenditure over income (391).
Restriction of credit of cultivators, such as limiting right of mortgage and sale, advocated (380).
Sources of credit: Landowners and wealthy villagers for those who have little security to offer, *Chettis* and Chinamen for those who have adequate security; co-operative loans are insufficient and have to be supplemented by other sources of credit (380), (391).

AGRICULTURAL INDUSTRIES:

Industrial concerns, establishment of, in rural areas should be encouraged (384).
Leisure period: work on holding occupies 4 months; in the slack season cultivator does manuring, clearing, etc. (384); none in one district (392).

SHWE, U, GALE, U YIN *and* NYUN U—*contd.*

AGRICULTURAL INDUSTRIES—*contd.*

Preparation of agricultural produce for consumption, industries connected with should be encouraged by Government (384), (392).
Public works, roads, irrigation, railways, etc., co-operative officers should arrange for cultivators to obtain subsidiary employment in (389).
Study, intensive, of each rural industry advocated (384).

AGRICULTURAL LABOUR:

Attraction of, by co-operative and Government loans and allotment of land (384-5); by taking measures against cholera (392).
Myitkyina district: colonisation measures adopted by Government (392).
Shortage, in Burma (385); no shortage in one district (392).

ANIMAL HUSBANDRY:

Breeding: Cattle do not thrive owing to neglect (378), (384).
Fodder: Burning of straw and dry grass in the dry season should be stopped (384).
——— Crops: paddy stubble, jowar stalks and bean husks (391).
——— Forest reserve pastures should be increased (384).
——— Landowners need instruction as to (384).
——— Scarcity for 120 days from March to June (384); for 8 weeks from October to December (392).
——— Water storage by weirs, advocated (384).

CAPITAL, ATTRACTION OF, TO AGRICULTURE:

Improvement of land prevented by indiscriminate leasing of land (387), lack or excess of water (393).

CO-OPERATION:

Cattle breeding societies should be formed as an experiment (386); Registrars should circulate advice (390).
Consolidation of holdings societies advocated (386).
Department: should give more advice and support (394) 64811-2.
Government: should lend to societies at low interest (388), (393); should exercise closer supervision and give more assistance (390); should take charge of Co-operative Council (393), (394) 64813, 64819-20.
Guaranteeing unions: in some cases have had to pay (395) 64821-7.
Improvement societies advocated as an experiment (386).
Interest: excessive (388), (393).
Joint farming societies: require advice of Registrar (389).
Liability, unlimited, a good thing (394) 64806.
Long term loans necessary (388).
Machinery, agricultural, joint use of: should be undertaken by credit societies (386); requires advertisement by Agricultural Department (389).
Members: important that they should understand principles (394) 64809-10.
Minorities should be compelled to come into schemes for joint improvement (386); not feasible as to irrigation (393).
Non-officials should help by propaganda, by newspapers, schools, etc. (389).
Objects, societies have not yet achieved (386), (393).
Progress: enquiry as to cause of decline advocated (388), (394) 64814.
Purchase societies advocated (386); Government help necessary at first (389).
Registrars, should continue in office for at least 12 years (388).
Repayment, time should be extended (390).
Revenue, payment should be postponed to 30th June (388).
Sale societies advocated (386); have collapsed, require finance (389).
Subsidiary employment on public works, roads, irrigation, supply of timber, etc., to railways, should be arranged by Co-operative officers (389).
Supervision, closer, by Government necessary (390).
Treasuries, societies should be able to deposit funds with (388).
Women: Registrars should form industrial, handicraft, saving and other societies (390).

CROPS AND CROP PROTECTION:

Fodder: Paddy stubble, jowar stalks and bean husks only (391).
Heavier yielding food crops should be grown (382).
New crops, demonstration of, necessary (382).

SHWE, U, GALE, U YIN *and* **NYUN, U**—*contd.*

CROPS AND CROP PROTECTION—*contd.*

Paddy, long lived, *Nga-sein-gyi*, successfully introduced by Agricultural Department (391).
Protection: insufficient (392).
Seed distribution depots advocated (391).
Seed, pure, distribution of, facilitated by showing cultivators that higher prices are paid for crops grown from pure seed (382).
Wild animals, methods of scaring away (391).

CULTIVATION:

Breaking of surface before rains not possible (394) 64816-8.
Gwin-set plough, a great improvement (390-1).
Instruction needed as to rotations, mixtures, periods of planting, destruction of insect pests (382-3), (391).
Protective measures ineffective (382).
Tillage, existing system defective (382), (391).
Waste of time through growing unseasonal crops, bad implements, poor seed (378), (383).

DEMONSTRATION AND PROPAGANDA:

Fertilisers, demonstration of, necessary (382).
Gwin-set revolving harrow should be demonstrated (390).
New crops, demonstration of, necessary (382).

EDUCATION:

Administration: should rest with school committees and teachers under control of Government which should give grants-in-aid (390).
Adult: should be encouraged by Government giving preference to educated persons (379), (390).
Agriculture, should be a compulsory subject in schools (386-7).
Agricultural: Agricultural classes, teachers in rural areas should be drawn from (378).
———— Extension, urgent need of (378), (390).
———— Students mainly drawn from agricultural classes (379).
———— Teachers insufficient (378), (390).
Attendance, in fourth class, small proportion, due to parents lack of desire for education and requiring their children to work (387), (393).
Careers of agricultural students: majority become paid servants (379); students, higher or collegiate, should be compelled to serve in Agricultural Department and be trained in agriculture before going to other departments (386).
Compulsory: advocated in suitable places (393).
Facilities, insufficient (393).
Garden cultivation should be taught in schools (379).
Handicrafts should be taught in schools (379).
Middle class youths should be attracted to agriculture by education (379); by lease of waste jungle land free of revenue (390).
Nature study advocated (379).
Physical exercises should be taught (384).
Poor children should be educated as boarders at school, their expenses being paid (379).
Practical as well as theoretical education advocated (390).
Recreations for lads should be arranged (390).
School farms advocated (379).
School plots advocated (379).

FERTILISERS:

Adulteration: analysis should be made by experts (382).
———— is unknown (391).
Artificial, not used (391).
Charcoal as a fuel advocated (391).
Demonstration necessary (382).

FINANCE:

Short term loans should be issued by Government at 10 per cent per mensem (380).

SHWE, U, GALE, U YIN *and* NYUN, U—*contd.*

FORESTS :

Afforestation advocated near villages (385) ; no opening for (393).
Agricultural purposes, full use not being made for (385).
Cultivation, should be extended (385), (393).
Erosion of soil, none in consequence of deterioration of forests and floods (385).
Extraction of timber and bamboo for implements, building and firewood, licenses should be extended (385), (393).
Grazing: facilities should be extended ; forests are not suffering from excessive grazing (385), (393).

HOLDINGS :

Arbitration by village committees advocated (391).
Consolidation : owners of adjacent holdings should have right of pre-emption (381).
Legislation necessary for consolidation (391).
Legislation necessary to deal with minors, widows and persons legally incapable, and to keep disputes out of the Courts (381).

IMPLEMENTS :

Government, should supply agriculturists with funds to buy implements (383).
Gwin-set revolving harrow should be demonstrated (390-1).
Loss of time and outturn owing to inefficient implements (383).
Weed cutter, mechanical, advocated (392).

IRRIGATION :

Bribery of officers of Canal Department (381).
Distribution of canal water, system unsatisfactory (381), (391).
Floods, measures to prevent, necessary (391).
Minor Schemes, advice necessary (394) 64815.
Paddy, water should be given earlier (394) 64814.
Schemes necessary (381), (391).
Wastage by evaporation and absorption in the soil should be prevented by reservoirs and gardens and trees (381).

MARKETING :

Facilities : unsatisfactory (385).
Foreign merchants, Burmans should be put in direct touch with ; cultivators only get one-third of price paid by foreign merchants (385).
Forward sales of crops before harvest is detrimental to producers ; remedy is to supply cultivators with funds (385).
Information as to market conditions, etc., should be supplied to cultivators, etc. (386).
Middlemen make excessive profits (385) ; cultivators only get one-third of price paid by foreign merchants (385).

SOILS :

Alkali (usar) and other unculturable land can be reclaimed by mixing with sand and silt by canal water (381), (391).
Reclamation : by bunds and irrigation (391).
Silting, beneficial effects of (391).

STATISTICS :

Forests, area of, should be ascertained (387).
Land culturable but uncultivated, area should be worked out (387).

TARIFFS AND SEA FREIGHTS :

Free trade advocated (386).

VETERINARY :

Department should be under Director of Agriculture (383), (392).
Diseases : Contagious : Legislation as to notification, segregation, compulsory inoculation, etc., not advocated (383), (392).

SHWE, U, GALE, U YIN *and* **NYUN, U**—*concld.*

VETERINARY—*contd.*

Dispensaries:
District boards, should not remain under control of (383).
Expansion inadequate (383), (392).
Provincial control advocated (383), (392).
Touring: facilities afforded by, are unknown to agriculturists (383).
Use of, by agriculturists, not full (383); is full (392).
Inoculation: obstacle, corrupt practices of veterinary assistants (383); no fee charged but people have no faith in it (392).
Muktesar Institute: should be extended (383).
Provincial Veterinary Research institution advocated (383).
Research: Further facilities advocated (383); not desirable (392).
Serum: supply sufficient (383); insufficient if general inoculation were attempted (392).
Superior Veterinary Officer with the Government of India, appointment of, advocated (383).
Veterinary Assistants: take bribes (383).

WELFARE OF RURAL POPULATION:

Hereditary occupations followed (387).
Hygiene: regulations necessary as to buildings, cattle breeding and water supply (387), (393).
Surveys, economic, in typical villages advocated; scope and method suggested (387): not necessary (393).
Thrift, lack of appreciation of advantages of (387).

SHIFTING CULTIVATION (*see under* **SOILS**).

SOILS.

Alkaline land: no large tracts (*McKerral*) (25) 61050; (usar) and other unculturable land can be reclaimed by mixing with sand and silt by canal water (*Shwe, etc.*) (381), (391).
Analyses, occasional requests for (*Hendry*) (59) 61569; useless without accurate knowledge of the district (*Charlton*) (292-3) 64101-3.
Bund construction: embankments leading to flooding on higher lands should be prohibited (*Maung, etc.*) (169), (172), (185) 62951-3.
Chindwin, Lower, inundation owing to ruined state of old tanks (*Gyi, etc.*) (398), (402) 64877-8.
Clay, black, yield very heavy if sufficient rainwater (*Pan, etc.*) (192).
Delta soils not uniform (*McKerral*) (25) 61052.
Deterioration due to constant cropping without manure (*McKerral*) (7).
Erosion: Due to deforestation following shifting cultivation in Shan Hills (*McKerral*) (25) 61053-6. (*See under* **FORESTS**).
——————Improved lay-out of holdings, construction of kazins and drains, advocated (*Robertson*) (341). (*See under* SHIFTING CULTIVATION *below*).
Floods, serious for 5 years in Insein, Tharrawaddy, Hanthawaddy and Maubin (*Pan, etc.*) (191).
Jungle, culturable, should be sold to cultivators, payment being by easy instalments (*Gyi, etc.*) (398); could be worked at a profit (402) 64879.
Nitrogen and phosphates the limiting factors in Lower Burma rice soils (*McKerral*) (25) 61057-9. (*See under* **FERTILISERS**).

RECLAMATION OF LAND:

By drainage (*Maung, etc.*) (189) 63020-1; by construction of bunds, by Government (172); by bunds and irrigation (*Shwe, etc.*) (391); by fertilisers (*Pan, etc.*) (192); by Government aid (196); by silting (200-1) 63062-6; schemes in Delta by pumping silt will improve public health (*Jolly*) (163-4) 62761-2.
Sandy soils deteriorating (*Pan, etc.*) (192).

SHIFTING CULTIVATION:

In Cachin Hills causes soil erosion and landslides (*Hopwood*) (116). Causes serious damage (117) 62221-7. Control impossible without reservation (117) 62228-30.
Silting, beneficial effects of (*Shwe, etc.*) (391).

SOILS—*contd.*

SHIFTING CULTIVATION—*contd.*

Silt waste in Irrawaddy (*McKerral*) (24) 61041-8, (32) 61184-6. (*See* Silting *under* **IRRIGATION**).

SURVEY:

(*McKerral*) (25) 61051; by agricultural chemist (45) 61382-9; (*Charlton*) (292-3) 64101-6; very imperfect, but some definite information obtained; samples taken by the auger to depth of 6 or 7 ins. (297) 64177-82; in Pegu District not quite completed owing to lack of staff (*Hendry*) (59) 61568.

Virgin jungle, most of paddy area of South Burma reclaimed from, within the last 10 years (*McKerral*) (7).

Waterlogging (*McKerral*) (25) 61049, (38) 61266-70.

STANDARD OF LIVING (*see under* **WELFARE OF RURAL POPULATION**).

STATISTICS.

Agricultural: arrangement and publication of: of no value (*Pan, etc.*) (195); importance of (*Jevons*) (273) 63884-6.

Co-operative societies, progress of (*Dunn*) (81) 61777-83.

Experiments as to yields advocated (*Edwards* and *Nelson*) (229) 63404.

Forests, area of, should be ascertained (*Shwe, etc.*) (387).

Groundnut: all channels of consumption should be traced (*Edwards* and *Nelson*) (227), (231) 63434-5.

Hydrographical, being collected and collated (*Stuart*) (249).

Land culturable but uncultivated, area should be worked out (*Shwe, etc.*) (387).

Land Records Department: crop reports of very little commercial importance as regards cotton and groundnut (*Edwards and Nelson*) (227); on an acreage basis; accurate as to rice (228-9) 63402-4; earlier information required; inaccurate as to groundnut (236-7) 63531-41.

Livestock and implements, of doubtful practical value (*Pan, etc.*) (195).

Methods satisfactory (*McKerral*) (30) 61147.

Settlement Officer's reports contain full descriptions of agricultural conditions and practice (*McKerral*) (38) 61271-5.

Surveys: economic (*see under* **WELFARE OF RURAL POPULATION**).

Surveys: soils (*see under* **SOILS**).

STUART, J. D., A.M.I.C.E., M.I.E., Chief Engineer, Public Works Department (Irrigation), Burma (240-54).

CROPS AND CROP PROTECTION:

Kyaukse District: canals irrigate about half total irrigated area bearing crops other than rice; double cropping, *e.g.*, sesamum before rice (242).

Rice: occupies ninety per cent of the whole irrigated area (242).

IRRIGATION:

Ava Canal, reservoir on the Samon river being investigated (245).

Average annual irrigation decreased in 1901-5; explanation (241-2).

Bawle Island in Insein District, attempt to prevent floods (249).

Bunds: (*see under* Embankments *below*).

Canals, four major: figures of irrigation done by; ninety-nine per cent under rice (242); constructed from funds supplied by Government of India, but purchased by Government of Burma in 1921-2 (243).

Consolidated rate charged on all irrigated areas (243); does not lead to less economy in use of water (253) 63647-54.

Cost of irrigation low, but lack of opportunity (253), 63645-6.

Department: responsible for maintenance of navigable channels declared main waterways by Local Government (249) 63585; can manage both subjects (251) 63619.

Distribution of water: application of more scientific methods has increased area irrigated (244).

Drainage and reclamation: (248-9).

——————— Contour surveys (248).

——————— River training without embankments very successful (248).

STUART, J. D.—*contd.*

IRRIGATION—*contd.*

Embankments: receive a credit of 50 per cent of gross land revenue demand on areas protected by them; particulars; committee to examine the question (247-8); benefit protected areas but detrimental to areas outside protection, because they force up flood levels (250) 63603; not insanitary (250) 63604-5; should be removed (251) 63620-5, (252) 63628-9, (254) 63662.

Financial results: table (243).

Floods: practically every year, doing an enormous amount of damage; two committees appointed; department dealing with (252) 63636-40.

Irrawaddy: problems of conservancy, not irrigation (249) 63581-4; a building-up river; deposit of silt (250-1) 63597-612.

Kalabyagi Canal in Yamethin District under consideration (245).

Kyaukse District: canals irrigate about half total irrigated area bearing crops other than rice; double cropping, *e.g.*, sesamum before rice (242); area irrigated 1901-25 (244); Panlaung River scheme (244); Pyaungbya and Paleik Canals being re-modelled (245).

Land Records, Superintendent of, works in consultation with Executive Engineer (243), (253) 63647-50.

Levels of older works followed, with one unfortunate exception (254) 63664.

Magwe District: survey being prepared (245).

Man Canal in Minbu District remodelled (245).

Meiktila District: tank projects being considered, for protective purposes (245-6).

Mileage of Government irrigation channels increased 45 miles per annum for 25 years (242).

Minor irrigation works: in Sagaing District, handed over to cultivators; Government maintenance unnecessary (251-2) 63626-7, (252) 63630-5.

Mon, North, Canal, a new distributary sanctioned (244).

Mu Canal in Shwebo District: surveys in progress (245).

Myanaung embankment area: drainage problem to be considered (248).

Navigation channels (246).

Paleik Canal being re-modelled at cost of 3½ lakhs (245).

Panlaung River: scheme for construction of flood—modulating reservoir sanctioned for 43 lakhs (244).

Progress since 1901; lists of canals and costs (240-2).

Pyaungbya Canal: being remodelled: cost 7 lakhs (245).

Pyuntaza Plain streams: annual flooding (248).

Research: River Irrawaddy: sufficient known as to silting and scouring action (251) 63611.

Revenue: Collected by Civil Officers (244).

———— Canal Revenue staff amalgamated with Land Revenue staff on Shwebo Canal; arrangement being introduced in other districts (243-4); a satisfactory system (253-4) 63655-61.

Salin Canals: scheme for remodelling sanctioned: cost 27 lakhs (244).

Scope for irrigation for 100,000 acres in Sagaing and Kyauksee districts, but cost prohibitive (254) 63663.

Shwebo Canal: to be remodelled: cost 10 lakhs (244).

Silting: by River Irrawaddy; scouring and silting actions; difficult to increase deposit by sluice gates in the embankments. Research: sufficient already known (250-1) 63597-612.

Sittang River: most unstable, danger of cutting bunds (252-3) 63641-4.

Staff: inadequate (249).

Statistics, hydrographical, being collected and collated (249).

Taunggan tank in Mandalay District being remodelled: Rs. 62,000 (245).

Thitson and Samon rivers: contour survey carried out with a view to co-ordination (245).

Toungoo District: attempt to reclaim by drainage (249).

Tube well, not satisfactory (251) 63613-8.

Upper Burma: Area irrigated trebled since 1901 (240).

———— Dry zone, irrigation has been practised from time immemorial (240).

Water hyacinth: problem under Irrigation Department (249-50) 63589-96.

Wundwin Chaung in Meiktila District: storage reservoir for 3 lakhs (245).

Yenatha Canal in Mandalay District: estimate under preparation for construction of (245).

RESEARCH:

Irrawaddy River: sufficient known as to silt and scouring action (251) 63611.

STUART, J. D.—*concld.*

STATISTICS :

Hydrographical, being collected and collated (249).

WATER HYACINTH :

Problem under Irrigation Department ; certain channels badly blocked ; condition remaining the same ; should be dealt with on an all-India basis ; information should be collected from all over the world (249-50) 63589-96.

SUGARCANE (*see under* **CROPS AND CROP PROTECTION**).

SURVEYS, economic (*see under* **WELFARE OF RURAL POPULATION**).

SURVEYS, soils (*see under* **SOILS**).

TACCAVI (*see under* **FINANCE**).

TANKS (*see under* **IRRIGATION**).

TARIFFS AND SEA FREIGHTS.

Cotton and groundnut products : customs duty and sea freight do not adversely affect prosperity of cultivator (*Edwards and Nelson*) (226), (233) 63477-8.

EXPORT CESS :

On rice, of Rs. 5-4-0 a ton, does not affect competition with other producing countries (*Edwards and Nelson*) (235) 63498-9 ; on bran, would not affect price in Burma (235) 63502 ; incidence largely on producers (*Jevons*) (275) 63908-11.

On rice and oils, has been appropriated to Central Revenues ; special taxes for particular purposes are very useful in early stages of development (*Jevons*) (276-7) 62923-8.

On rice and hides injurious to cultivators (*Dunn*) (69), (72) 61701-5.

Free trade advocated (*Shwe, etc.*) (386).

Fodder : export duty on bhoosie, *i.e.*, bran, advocated (*Tun, etc.*) (208), (211-2) 63198-206.

Groundnuts : (*see under* Cotton *above*).

Hides, export has decreased owing to export tax (*Dunn*) (69), (72) 61701-5.

Import duties injurious to cultivators (*Dunn*) (69), (72) 61699-700.

Oils (*see under* EXPORT CESS *above*).

TELEGRAPH FACILITIES (*see under* POSTS AND TELEGRAPHS *under* **ADMINISTRATION**).

TIN, U PO, Assistant Registrar, Co-operative Societies, Pegu, East Division, Rangoon (104-115). Experience : 14 years with co-operative movement (105) 62005-7, (108) 62077-8.

AGRICULTURAL DEPARTMENT :

Co-operative societies help in seed distribution (106) 62035-6 ; and receive help from Department (110) 62109-11.

AGRICULTURAL INDEBTEDNESS :

Causes of borrowing : improved standard of living and higher rate of interest (104).

Chetty : interest 18 to 36 per cent ; insists upon valuable security ; not elastic (104).

Co-operative society : interest 15 per cent ; on personal security of members, loans extended in bad years ; the best method (105).

Measures necessary for lightening agriculture's burden of debt : improvement in production and marketing, joint purchase, reduced rate of interest, thrift, Usurious Loans Act, redemption of mortgages (105).

Moneylender, village : high rate of interest : 36 to 60 per cent in cash and 100 per cent in kind ; personal contract and elasticity (104).

Repayment, causes preventing (105) ; co-operators also live beyond their incomes (114) 62192-7.

Restriction or control of cultivators' credit not advisable (105).

Sources of credit : village moneylender, chetty and co-operative society (104).

Usurious Loans Act should be rigidly enforced (105) ; provisions should be brought to the notice of Judges (114) 62198-200.

CO-OPERATION :

Audit, primary, by Co-operative Council, good but broke down owing to lack of funds to pay auditors (113) 62182-6.

Buddhist priests : many have nothing to do with worldly affairs but some have started societies (114) 62201-2.

TIN, U PO—*contd.*

CO-OPERATION—*contd.*

Burma Co-operative Association, unofficial, activities limited (110) 62113-8.
Capital of societies (113) 62180-1.
Cattle insurance, not working well (114) 62203.
Decline in movement: mainly due to relaxing of Government supervision (105-6) 62008-14; which should be done gradually (109) 62079-82. Supervision should take the place of super-audit (109) 62084-7. Failures due to small margin and high cost of management (109) 62088-90; not due to rate of interest being too low, nor to cultivators' fear of offending moneylenders (110-1) 62121-33. Upper Burma (114) 62203-13.
Department, comparative size of (109) 62083.
Educational influence (110) 62112, (113-4) 62187.
Finance: interest 15 per cent on personal security of members; loans extended in bad years; co-operative, the best method (105).
Reserve fund, share capital, current profits, loans: movement solvent (113) 62167-79.
Guaranteeing unions: recommend loans and guarantee repayment to Central Bank; the last resort in liquidation (112) 62145-54.
Interest: should be lowered (104); joint stock banks 6 to 7 per cent: Central Banks 10 per cent, primary societies 15 per cent, (105), (106-7) 62037-42; rates have decreased as the result of co-operation (109-110) 62100-4. Co-operative failures not due to interest being too low (110-1) 62121-8.
Liquidation: 300 societies; outstanding liabilities 10 lakhs; 12 per cent recovered in one year; sale of members' land, unlimited liability of members called upon in one case, guaranteeing unions; 8 years to liquidate owing to employment of non-officials (112) 62145-61.
Literature issued by Department in vernacular (110) 62105-8.
Lower Burma wet tract, movement satisfactory (106) 62024-7.
Management of primary societies, cost too high; majority of members take an interest in management (109) 62090-9.
Middle dry tract, movement particularly disappointing, owing to bad seasons (106) 62015-23.
Non-official help, activities limited (110) 62113-8.
Primary societies, membership (107) 62046-8.
Propaganda, none being done by department except in Arakan; unofficial propaganda not sufficient (106) 62029-34.
no Records of work done by department (108) 62062-3.
Repayments: about 24 per cent, in cash; period between repayment of loan and granting fresh loan; guaranteeing unions the final resort (111-2) 62141-54.
Reputation, not very good (107) 62043-5.
Reserve fund: 37 lakhs (113) 62167-70.
Sale societies: groundnut: 80 per cent advance; satisfactory but ceased during War (107) 62049-57, (108) 62074-6.
Seed distribution, help given to Agricultural Department (106) 62035-6; help received from Agricultural Department (110) 62109-11.
Shares: 37 lakhs paid up in cash (112-3) 62162-6.
Staff, training and recruitment: annual courses and examinations (111) 62134-40; book-keeping and accountancy not strictly enforced subjects (114) 62188-91.
Supervision by department (108) 62064-9.
Taccavi should be lent through co-operative banks at rates of interest not exceeding rate at which Government borrows (104); but not for non-members (108) 62070-3, (110) 62119-20.
Thrift has been promoted (109) 62100.
Upper Burma: 4,000 credit societies (107-8) 62058-61, (114) 62203-13.

FINANCE:

Chetty: interest 18 to 36 per cent; insists upon valuable security, not elastic (104).
Co-operative movement should be encouraged and interest should be lowered (104).
Moneylender, village: high interest, personal contact and elasticity (104).
Reserve fund, share capital, current profits, loans; movement solvent (113) 62167-79.
Taccavi should be lent through co-operative banks at rates of interest not exceeding rate at which Government borrows (104); but not for non-members (108) 62070-3, (110) 62119-20.

TIN, U PO—*concld.*

MARKETING :

Co-operative sale societies : groundnut : 80 per cent of value advanced, satisfactory but ceased during War (107) 62049-57, (108) 62074-6.

TIN, THUGYI U BA (witness), (*see under* **GYI**, *etc.*)

TUN, U (witness) (*see under* **PAN, SAVA**, *etc.*)

TUN, U PAW, A.T.M., M.L.C., Bar.-at-Law ; **DUMONT, J. L.**, B.Sc. (Edin.) ; *and* **MAUNG, U KHIN**, B.A., M.L.A. (205-223). Conference of landowners and cultivators to prepare evidence (209) 63170-1.

ADMINISTRATION :

Local self-government, beneficial to agriculture (212) 63207-16, (214-6) 63248-70.
Roads (217-8) 63292-301.
Posts and Telegraphs : dilatory or non-existent, a great handicap to agricultural population (206).
Transport : (*see under* Agricultural Department *below*).
———— Lack of, frustrates work of Agricultural and Veterinary Departments (206).
———— Provincial and district contributions to, and control over ; figures (217-8) 63292-301.
———— Railways and steamers, agriculture very poorly served by, owing to lack of roads and landing jetties (206), (213) 63221-2.
———— Roads : network required (206).
———— (*see under* Veterinary *below*).

AGRICULTURAL DEPARTMENT :

Claims of, as to improvements (209-11) 63176-87.
Services of : owing to lack of communications, nothing done for cultivators ; conditions the same as 50 years ago (206), (209-11) 63176-87. (*see under* Crops *below*).
Staff : more junior officers required for village work (210-1) 63184-7.
Yamethin Township ; farm benefits only the immediate neighbourhood (209) 63176.

AGRICULTURAL INDEBTEDNESS :

Causes of borrowing : poverty, loss of cattle, high price of cattle owing to slaughter by licensees, crop failures owing to drought and flood, fisheries, lack of irrigation (206) ; not litigation, which is caused by indebtedness (223) 63367-70.
Land mortgage banks, should be established (207).

Measures to lighten agriculture's burden of debt : Usurious Loans Act, rigid enforcement of ; land mortgage banks, extension of Government loans, co-operative societies (207).
Repayment prevented by : poverty, high interest, early sale of crops to pay land Revenue in March, crop failure owing to drought and flood (207).
Sources of credit : chettyars, Government and co-operative societies (206).
Usurious Loans Act : essential to enforce with more rigidity and more extensively (207).

AGRICULTURAL INDUSTRIES :

Health conditions : education and propaganda by vernacular pamphlets and travelling cinemas in the slack season to induce people to devote spare time to improving (208).
Leisure period : May to September cultivating work ; October and November collecting grass ; December to February cultivating ; March and April, little to do but collecting supplies (208).
Preparation of agricultural produce for consumption : Government might do more (208).

AGRICULTURAL LABOUR :

Attraction of, by labour agents, reduced fares and exemption from capitation taxes (208), (221) 63332-42.
Machinery, introduction of, would oust manual labourer from his occupation (207).
Wages : Rs. 10 a month with food and clothing (214) 63243-7.

TUN, U PAW, DUMONT, J. L. *and* MAUNG, U KHIN—*contd.*

ANIMAL HUSBANDRY :

Cattle-breeding much less profitable than agriculture (220) 63327.
Epidemics : cause serious loss to agriculturists (211) 63195-6.
Fodder : bhoosie, *i.e.*, bran, high cost of, causes deterioration of cattle ; export duty advocated (208), (211-2) 63198-206.
Grazing : grounds, inadequate (208).
Horse-racing, encouragement of, by Government officials, deprecated (207-8).
Indebtedness : caused by loss of cattle (206), (211) 63195-6.
Prices of plough cattle, three times what they were 30 years ago : due to enormous slaughtering of cattle by licensees (206), and disease ; inadequate veterinary staff (217) 63285-7, (220) 63321-8, (222) 63348-52. Rs. 275 recently paid for a pair of bullocks (223) 63371-4.
Shows, exhibitions, competitions and prizes should be given to improve breeds (207).

BURMA VILLAGE ACT :

Restrictions on villagers living on their holdings should be abolished (208), (213) 63223-4.

CAPITATION TAX :

Labourers should be exempted from (208) ; under Burma Rural Self-Government Act, 1921, district councils have option to convert into a tax on circumstances and property ; but has not been done owing to opposition of Government ; should be done (221) 63332-42.

CO-OPERATION :

Credit societies (206-7).
Government should encourage (211) 63188.
Non-officials : help insufficient (216) 63271-8 ; receiving encouragement from Department (218-9) 63302-9.
Progress : not flourishing so well in Upper Burma as in Lower Burma (211) 63188 ; not so active as 5 years ago (216) 63271-3.

CROPS AND CROP PROTECTION :

Egret, preserved because a great insect feeder (205).
Foreign markets : varieties of paddy suitable for, should be made known to cultivators (207).
Frogs : insect feeders (205), (209) 63172-5, (222) 63364-5.
Gram : distribution of immune varieties by Agricultural Department (210) 63181-2.
Outturn : paddy, generally 8 baskets per acre, 15 years ago and now (210) 63176-80 ; 50 per cent greater with seed from Agricultural Department (213) 63225-40.
Pests : Protective measures should be taken immediately (207) ; Research necessary (205).
Price of paddy : considerable increase (210) 63179-80.
Rats : do a great deal of damage (209) 63173-4.
Seed distribution : should be centre of distribution in each village tract (207), (209) 63176.
————————Farms, 25 to 30 acres, required in each village tract (205-7) ; should be self-supporting (219-20) 63310-20.
Snipe, great insect feeders (205), (222) 63366.

CULTIVATION :

Kazins, importance of (208), (213) 63217-20, (214) 63238-42.
Paddy : present method most suitable (207).
Plough cattle, price of (*see under* Animal Husbandry *above*).

DEMONSTRATION AND PROPAGANDA :

Farms, 25 to 30 acres, for demonstration, required in each village tract (205-6) ; should be self-supporting (219-20) 63310-20.
Foreign markets : varieties of paddy suitable for, should be made known to agriculturists (207).

TUN, U PAW, DUMONT, J. L. *and* MAUNG, U KHIN—*concld.*

DEMONSTRATION AND PROPAGANDA—*contd.*

Hmawbi Farm : excellent for research work but for demonstration serves only 5 miles radius (205).
Staff : more junior officers required for village work (210-1) 63184-7.

EDUCATION :

Agricultural : small scope for employment of educated persons (217) 63288-91.
Local control necessary (214-6) 63248-70.
Primary, a crying need (214) 63248-54.

FERTILISERS :

Artificial : not suitable for paddy cultivation, washed away by heavy rains (207).

FINANCE :

Amount : Rs. 20 or Rs. 30 to Rs. 55 per acre (211) 63192-4, (222) 63353-63.
Co-operative societies (206-7).
Government loans : formality, delay, inadequacy, repayment instalments too large. Township officers should have authority (206-7) ; Government should finance agriculture (211) 63189-94. French system at Pondicherry should be adopted (221-2) 63343-7, (222) 63353-63.
Kazins, loans should be granted for building (208), (213) 63217-20, (214) 63238-42.
Land mortgage banks : should be established (207).

HOLDINGS :

Plots : should be about 2 acres ; loans should be granted for building high and straight kazins (208), (213) 63217-20, (214) 63238-42.
Size, average : paddy land, 25 to 30 acres : the suitable size (207).

IMPLEMENTS :

Existing implements are best adapted to needs of the country (207)
Machinery : introduction of, would oust manual labourer from his occupation (207).

IRRIGATION :

Nankwe scheme, in abeyance (212) 63213-6.
Plots : should be about 2 acres in size ; loans should be granted for building high and straight kazins (208), (213) 63217-20.
Upper Burma : urgent need in Yamethin, Meiktila, Myingyan, etc. (207).

MARKETING :

Rice : premium price (213-4) 63225-40.

RESEARCH :

Foreign experts should be encouraged to spend holidays in India (205), (220-1) 63329-31.
on Pests, necessary (205).

TARIFFS AND SEA FREIGHTS :

Fodder : export duty on bhoosie, *i.e.*, bran, advocated (208), (211-2) 63198-206.

VETERINARY :

Department, owing to lack of communications, has done nothing for cultivators ; no signs of improvement in animal diseases (206), (207), (211) 63195-7.
Staff : inadequate (217) 63285-7.

WELFARE OF RURAL POPULATION :

Diet : Changed very little (216-7) 63281-2.
—— Condensed milk, not consumed in rural parts (216) 63281.
Dress : no change (217) 63283.
Plots (208).
Standard of living : in Lower Burma has not appreciably improved during the last 10 years (216-7) 63279-85.
Status of agriculturists too low (208), (221) 63331.

USURIOUS LOANS ACT (*see under* **AGRICULTURAL INDEBTEDNESS**).

VETERINARY.

Agricultural Adviser with the Government of India not a veterinarian (*Rippon*) (127).

ASSISTANTS:

Should be under control of circle boards (*Maung, etc.*) (172); pay, which is inadequate, has been revised (*Rippon*) (130) 62422-3; false statements of touring expenses (130) 62424; keeps medicines in his own residence (*Gyi, etc.*) (400) 64843-5; does not make unauthorised charges (404) 64910; take bribes (*Shwe, etc.*) (383).

Calcutta Veterinary College, staff receive a stipend while training (*Rippon*) (131) 62439-41.

Castrations, a few at Insein Veterinary School but none in the districts: by the Italian method (*Rippon*) (128) 62396-9.

Cattle-breeding entirely under Agricultural Department (*Rippon*) (128) 62382; (*McKerral*) (41) 61320-1. Agricultural Committee of 1925 recommended that breeding should be done by Veterinary Department and distribution by Agricultural Department; could not be done with present staff (132) 62461-2. No Advisory Committee though recommended by Agricultural Committee (132) 62463-4.

CONTAGIOUS DISEASES:

Difficulties in dealing with (*Rippon*) (126); legislation necessary (126). Cattle Disease Rules, 1914 (127) 62369-70; Policing necessary (127) 62370-2; system of reporting adequate but not carried out properly (132) 62457-60. Burma Village Act gives power to District Officers (*McKerral*) (10).

Frontier staff should be strengthened (*McKerral*) (10).

Legislation as to notification, segregation, compulsory inoculation, etc., not advocated (*Shwe, etc.*) (383), (392); (*Gyi, etc.*) (398).

Department: Should be under Director of Agriculture (*Dunn*) (67), (70-1) 61695-8; (*Shwe, etc.*) (383), (392); (*Maung, etc.*) (172); (*Dunn*) (67), (70-1) 61695-8; should be independent (*Rippon*) (126); but at present under Agricultural Department (127) 62362-5; should be independent (*McKerral*) (10), (26) 61076-7.

Services: satisfactory (*Maung, etc.*) (171); progress made (*McKerral*) (41) 61316-7; has brought immense benefits to agriculturists (*Gyi, etc.*) (396), (400) 64842; unsatisfactory (*Shwe, etc.*) (380); inadequate (*Pan, etc.*) (190-1); not in close touch with cultivators (195); owing to lack of communication, has done nothing for cultivators; no signs of improvement in animal diseases (*Tun, etc.*) (206), (207), (211) 63195-7; very strong in numbers (*Dunn*) (103) 61996; understaffed in superior grades; insufficient correlation with other departments (*McKerral*) (5).

DISPENSARIES:

Demand: not much (*McKerral*) (10); none for increased number (*Dunn*) (67)

District Boards: responsible for maintenance while Assistants in charge paid out of Provincial funds; system does not work well (*Rippon*) (126); should be provincialised (127) 62366-8, (131-2) 62448-56; municipalities asked to contribute (*Rippon*) (133) 62491-6; should not remain under control of (*Shwe, etc.*) (383); (*Maung, etc.*) (172); only four; district councils contribute to, but do not control (*Dunn*) (67).

Equipment should be improved (*Rippon*) (126).

Expansion not adequate (*Rippon*) (126); (*Shwe, etc.*) (383), (392).

Insufficient number of, under district boards (*Pan, etc.*) (193).

Prome, 2 animals treated daily on average (*Rippon*) (126).

Prome District Council has objected to paying for (*Dunn*) (67).

Provincial authority, control should be transferred to (*Rippon*) (126); (*Shwe, etc.*) (383), (392); control should not be transferred to (*Dunn*) (67).

Touring dispensaries: full use not made of (*Rippon*) (126), (133) 62485-6.
————facilities afforded by, are unknown to agriculturists (*Shwe, etc.*) (383).
————none in Insein District (*Pan, etc.*) (193).

Use of, by agriculturists: not full (*Maung, etc.*) (172); (*Rippon*) (126); (*Pan, etc.*) (193); (*Shwe, etc.*) (383); is full (*Shwe, etc.*) (392); freely used by agriculturists (*Gyi, etc.*) (398); none in Monywa Township (400) 64843.

Elephant diseases, no investigation of (*Rippon*) (130) 62425-6; high mortality through anthrax, etc.; research officer sanctioned but not yet appointed (133) 62487-90; importance of (31) 61156, (34) 61211-2.

VETERINARY—*contd.*

Horse-breeding transferred to Military Police (*Rippon*) (128) 62383-5.
Inoculation: no fee charged (*Rippon*) (126); (*Pan, etc.*) (193); (*Gyi, etc.*) (398); (*Shwe, etc.*) (392); except to municipalities and wealthy owners (*Rippon*) (126); obstacles to popularising (126).
———obstacle, corrupt practices of veterinary assistants (*Shwe, etc.*) (383); no fee charged but people have no faith in it (392); often too late (*Dan*) (238).
Insein Veterinary School: for training staff of Superior Provincial Veterinary Service (*Rippon*) (128) 62386-9; vernacular training in the past but English in future if possible; comparison with London (129) 62400-13, (131) 62442-6, (132) 62465-6; attendance 13 (132) 62467-77.
Inspector should be under control of district board (*Maung, etc.*) (172).
Legislation dealing with notification, segregation, etc., very necessary (*Dan*) (238).
Muktesar Institute: should be extended (*Shwe, etc.*) (383).
No popular demand for expansion of service (*Dunn*) (103) 61993-5.
Research: College at Insein to be opened (*McKerral*) (2), (17) 60920-2, (18) 60936.
———Further facilities required (*Rippon*) (126); (*Dann*) (238); (*Shwe, etc.*) (383); (*Pan, etc.*) (190); not desirable (*Shwe, etc.*) (392).
———No officers at present engaged on research (*Rippon*) (131) 62445-6; (*McKerral*) (2).
———Provincial institutions advocated as well as Muktesar (*Rippon*) (126), (128) 62378-81; (*McKerral*) (10), (30-1) 61154-6; (*Pan, etc.*) (193); (*Shwe, etc.*) (383).

RINDERPEST:

Serious, 100,000 deaths in some years (*McKerral*) (27-8) 61106-8; inoculation becoming more popular (*McKerral*) (41) 61318-9; serum-simultaneous inoculation (*Rippon*) (127) 62373-4.

SERUM:

Institute for preparation in Burma advocated (*McKerral*) (10); Committee in 1924 rejected this proposal (41) 61315.
Station for manufacturing in Burma (*Rippon*) (128) 62375-7; would be very expensive (133) 62478-84.
Supply:
Difficulty in obtaining (*McKerral*) (10); occasional difficulty in obtaining (*Rippon*) (126); system unsatisfactory (*Pan, etc.*) (193); sufficient (*Shwe, etc.*) (383) insufficient if general inoculation were attempted (*Shwe, etc.*) (392); sometimes insufficient (*Gyi, etc.*) (398).
Staff: inadequate (*Tun, etc.*) (217) 63285-7.
Superior Provincial Veterinary Service to be trained at Insein; must take a very long time (*Rippon*) (128) 62386-95.
Superior Veterinary Officer with the Government of India: should be appointed (*Rippon*) (127); (*Shwe, etc.*) (383); would increase efficiency (*Pan, etc.*) (193); not recommended (*Dunn*) (67).

WATER (*see under* Drinking Water *under* **WELFARE OF RURAL POPULATION**).
Waterlogging: (*McKerral*) (25) 61049, (38) 61266-70.

WATER HYACINTH.

Not so serious in Burma as in other Provinces (*McKerral*) (42) 61333-6.
Problem under Irrigation Department; certain channels badly blocked; condition remaining the same; should be dealt with on an all-India basis; information should be collected from all over the world (*Stuart*) (249-50) 63589-96.
Research necessary as to insect, fungus and bacteriological enemies (*Charlton*) (279); nobody actively engaged on now (297) 64171.
Sprays, chemical: merely mitigation; only arsenical spray likely to be effective (*Charlton*) (279); but cannot be used as it would poison cattle (289) 64038.

WEAVING (*see under* **AGRICULTURAL INDUSTRIES**).

WEIGHTS AND MEASURES (*see under* BASKET *under* **MARKETING**).

WELFARE OF RURAL POPULATION.

Beri-beri: a few outbreaks, mainly in isolated districts, forests, etc.; not alone due to consumption of polished rice; very little polished rice eaten (*Jolly*) (158) 62683-9.
Board of Economic Development, advocated (*Jevons*) (269) 63842.
Buddhist religion: prejudice against taking life leads to spread of plague through rats (*Jolly*) (147), (165) 62780.
———————— point of view compared with Western materialism (*Jevons*) (272) 63869-80.
Central Public Health Department under-staffed; must be developed (*Jolly*) (149), (153).
Character of the people: take an uneconomic view of life, but character not fixed (*Jevons*) (270-1) 63856-9, (272) 63869-80.
Charity: (*Gyi, etc.*) (403) 64905-7.
Children: medical inspection in Anglo-vernacular schools, a rudimentary system. Child welfare work valuable as educational propaganda (*Jolly*) (151); practically no rural child welfare shows held in the towns (163) 62750-2.
————————Proposed Assistant Director of Public Health for schools (164) 62772.

CHOLERA:

Causes panic but not so serious as malaria, hookworm, dysentery including diarrhœa (*Jolly*) (154) 62627-30. Outbreaks begin in dry weather when wells are low; a problem of water supply (161) 62721-3; an occupational disease, characteristic of harvest workers, due to drinking filthy water when thirsty (*Jevons*) (264).
Cinema: Would be appreciated as a novelty (*Gyi, etc.*) (403) 64909.

COMMUNICATIONS:

Importance of, in creating desire for better living (*Jevons*) (268) 63835-6, (276) 63917-22.
Improvement of, destroying isolation of village which is its only defence against infectious disease (*Jolly*) (148), (161) 62728.

CO-OPERATIVE SOCIETY:

For improvements should be established after formation of health service under district councils (*Jolly*) (147). Distribute quinine. No anti-malaria societies (157) 62674-5; not giving medical assistance; not considered to be part of their work (*Maung, etc.*) (189) 63024-33.

CRIME:

Caused by poverty (Sein) (364) 64675; great increase (*Dunn*) (97) 61924-5; partly due to lack of education (240) 63567; no connection with slack season (*Dan*) (240) 63570-4.
Tharawaddy District: large proportion of crime in (*Dan*) (239) 63551-3.
Has become quieter (*Hendry*) (64) 61650-3.
Deputy Commissioners, some take an interest in agriculture and (*McKerral*) (55) 61540-2.

DIET:

Adequate and well balanced (*Jolly*) (147), (167) 62804. Beri-beri, not alone due to eating rice; very little polished rice eaten. Has not heard of any lathyrism. Nutrition problems of great importance; central institution should be set up with outlying laboratory in Burma (158) 62681-94. Compared with Punjab diet (160) 62715-20. Research at Public Health Institution (163) 62753-5. "Pe-bin-pank" eaten in Burma and China (160) 62719, (168) 62815-6. (*See under* Eggs, Fish, Milk *and* Rice, *below*).
Changed very little (*Tun, etc.*) (216-7) 63281-2.
Condensed milk, not consumed in rural parts (*Tun, etc.*) (216) 63281; rise in standard (*Dunn*) (99) 61941-2.

DISEASE:

Conditions of living favour the spread of communicable disease (*Jolly*) (147). Malaria, hookworm, dysentery and diarrhœa the most serious; cholera not so serious (154) 62626-30. Preventible disease causes immense economic waste by deaths of workers at prime of life, loss estimated at over 10 crores of rupees per annum (*Jevons*) (264), (266) 63810.

WELFARE OF RURAL POPULATION—*contd.*

DISPENSARIES :

For distributing medicine and treatment of disease ; do not help in public health ; Sub-Assistant Surgeons in charge. Has not come across any lady doctors in dispensaries (*Jolly*) (161-2) 62732-8. Municipalities run their own dispensaries with financial aid from district boards and provincial revenues, under technical supervision of Inspector General of Civil Hospitals (162-3) 62744-9.

DISTRICT HEALTH SERVICE :

Practically none : part-time services of one Medical Officer per 300,000 persons and 26 Sanitary Inspectors in a rural population of 12 millions (*Jolly*) (148). Should precede treatment of special diseases (151-2). Scheme approved by Finance Committee (157) 62670-1, 62676. Financial difficulties (164) 62772-6. Organisation into districts and circles (161) 62729-31, (164-5) 62775-7. For many years its work will be mainly educative ; legislation necessary (165-7) 62787-98.

Health Officers :

At present only nominal ; should be full-time, Burmans, one for each circle, half-pay grant system (*Jolly*) (148-9) ; (*Jevons*) (265). Should be well paid (*Jolly*) (152). District Health Officer is the Civil Surgeon ; carries on private practice and is over-worked (162) 62743.

Dress : no change (*Tun etc.*) (217) 63283.

DRINKING WATER :

River supply dangerous (cholera) ; properly constructed shallow wells should be provided (*Jolly*) (149-150). Very little done to improve ; practically all rivers contaminated (157-8) 62677-80. Cholera, a problem of water supply (161) 62721-3. Very little done towards safeguarding (*Jevons*) (265), pure supply importance of, economically (266-7) 63811-5

See under Wells *below.*

Economic surveys : (*see under* Surveys *below*).

Efficiency of Burman labour compared with that of Indian and British (*Dunn*) (97) 61926-33.

Eggs : very little eaten (*Jolly*) (159) 62704-5.

Engineering Section of Public Health Department should be strengthened (*Jolly*) (150), (152).

Environmental conditions : not much can be done to improve, in the absence of district health service ; villagers must be aroused to possibilities of improvement (*Jolly*) (149). Change of attitude towards, in the towns, but not in rural areas (165) 62778-80. Village not more subject to disease than town (167) 62799-00.

Expectation of life, though higher than that of other Indian Provinces, pitiably low compared with European standards (*Jolly*) (147).

Finance : Municipalities receive financial aid from district boards and provincial revenues for dispensaries (*Jolly*) (162-3) 62744-9. Finance Committee sympathetic to public health service (163) 62757-8. Grants from Indian Research Fund Association for beri-beri research and Pasteur Institute. No assistance from Rockefeller Institute (164) 62764-8. Small proportion of public health budget spent in rural areas (164) 62771. Financial difficulties (164) 62776.

Fish : fresh or dried (*Ngapi*) eaten with rice (*Jolly*) (159) 62700-3, as a relish (159) 62708. Research (163) 62753-5.

Government Estates Department colonies (*Dunn*) (94) 61883-91.

Hereditary occupations followed (*Shwe, etc.*) (387).

Homesteads should be on the cultivated holding and not in the village ; this will lead to better cultivation, greater care of cattle, improved health of the family, investment of savings in banks instead of in jewellery, etc. (*Sein*) (353-4) ; restrictions should be abolished (364) 64667-9.

Hookworm : Latrines (*Jolly*) (150). No general policy except propaganda. Use of latrines decreases incidence. Infection mostly through the feet ; shoes or sandals a principal preventive. Experiments in Assam very significant but conditions different (156) 62653-7, (167) 62805-6. Excessive heat and rain destroy hookworm (165) 62786. Less prevalent among the Shans who eat raw meat (167) 62807-9.

HOUSING :

Mat and thatch raised on piles, possibly protects against Kala-azar, but affords cover for malaria mosquitoes : offers facilities for rats ; a few minor alterations

WELFARE OF RURAL POPULATION—*contd.*

HOUSING—*contd.*

in design would make a great difference (*Jolly*) (150), (167) 62799. Economic difficulty (165-6) 62789-90; vast increase in masonry buildings; use of corrugated iron (*Dunn*) (97) 61922. (*See under* Homesteads *above*).

HYGIENE:

Regulations necessary as to building, cattle breeding and water supply (*Shwe, etc.*) (387), (393); in villages cannot be improved, there being no drains and cattle being kept near houses (*Sein*) (353).

Improvement in condition of people (*McKerral*) (45) 61376-7.

Individual health; measures to improve, should follow environmental hygiene; vaccination for smallpox an exception (*Jolly*) (151).

Industrial development desirable to maintain standard of life; but sanitary conditions must be secured in towns (*Jevons*) (275-6) 63912-6.

Infantile mortality terribly high (*Jolly*) (147); malaria one of the principal causes (155) 62646-9. (*See under* Milk *below*).

Inspector-General of Civil Hospitals: in charge of medical training (*Jolly*) (159) 62696; of subsidised practitioners (157) 62672-3; and of maternity (162) 62740-2. Supervises hospitals under municipalities (162) 62744-5, (163) 62748.

Isolation of villages prevents spread of disease (*Jolly*) (147); but no other defence, and improved communications are destroying this isolation (*Jolly*) (148), (161) 62728.

Kala-azar: Mat and thatch houses raised on pile possibly protect against (*Jolly*) (150). Not endemic. Can be mistaken for malaria. Arakan threatened with (154-5) 62637-40

Lathyrism: has heard of none (*Jolly*) (158) 62690.

Latrines: in dry zone deep pit; in flooded areas septic tank. Officer on special duty should be appointed (*Jolly*) (150). Wearing of shoes when visiting (151).

"Makkalam": used as the name of many diseases (*Jolly*) (167) 62801-3.

MALARIA:

Co-operative societies distribute quinine; no anti-malaria society (*Jolly*) (157) 62674-5.

Cultivation, complete, principal factor in getting rid of malaria (*Jolly*) (161) 62724-7; handicapped by malaria (*Dunn*) (98) 61934-40.

Housing, mat and thatch, shelters mosquito (*Jolly*) (147), (150).

Imported infection worse (155) 62642-3.

Kala-azar can be mistaken for (154) 62631-40.

Kyaukpyu; drainage and stopping wet cultivation (154) 62631-6.

at Minbu in Upper Burma (*McKerral*) (36) 61244-5.

Mosquito netting should be woven locally (*Jolly*) (150).

Quinine necessary (*Jolly*) (150). Distribution insufficient; should be given free to everybody but financial difficulties too great (155) 62644-6. Cinchona febrifuge distributed: as good as pure quinine (155) 62650-2. Co-operative societies distribute (157) 62674.

Season varies; worst at beginning and end of rains (*Jolly*) (155) 62641.

Village site, improvement of (*Jolly*) (150-1).

Milk: very little consumed except for a recent tendency to take condensed milk. Burmans get on very well without, very difficult to keep babies alive when not breast fed (*Jolly*) (159-160) 62706-10; in large towns supply unsatisfactory; Government and Co-operative societies should undertake (*Pan, etc.*) (197), (201) 63067.

Municipalities run their own hospitals with financial grants from district boards and provincial revenues, under technical supervision of Inspector-General of Civil Hospitals (*Jolly*) (162-3) 62744-9.

Opium smoking encouraged by Chinese (*Gyi, etc.*) (404) 64917-9.

Plague, an occupational disease, affecting workers in and about rice-mills, grain godown and shops (*Jevons*) (264).

Population, pressure on soil (*Jevons*) (268) 63830-7; compared with Western countries (272-3) 63881-4.

Provincial Public Health Board: distributes grants; has a non-official majority (*Jolly*) (160) 62713-4.

Public Health Act: does not exist but is necessary (*Jolly*) (164) 62769-70. Should leave wide powers of discretion to district councils (165-7) 62787-98.

WELFARE OF RURAL POPULATION—*contd.*

PUBLIC HEALTH DEPARTMENT:

Has not been able to safeguard health of rural population except by vaccination and staying progress of epidemics (*Jevons*) (265); Central: under-staffed; must be developed (*Jolly*) (149), (153); in relation to the Medical Department (160) 62711-2; likely to develop (163) 62760; Engineering section should be strengthened (150), (152).

Public Health Institution opened last year (*Jolly*) (163) 62753-5; Finance Committee approved full-time officer (164) 62772.

Publicity: Hygiene publicity officer produces pamphlets, cinema films, etc. (*Jolly*) (157) 62668-9. Posters issued do not frighten people (164) 62763. Non-official assistance (165) 62785. Importance of education (165-6) 62787-94.

Public opinion: great awakening as to public health in recent years (*Jolly*) (163) 62756-8; has been stimulated by grant of local self-government (164) 62775. Importance of education on public health matters (165-6) 62787-94.

Punjab canal colonies: standard of living being raised (*Jevons*) (269) 63839.

Punjabi compared with Burman as to physique; not much difference, both good; considerable immigration of Punjabis into Burma. Comparison of diets (*Jolly*) (160) 62715-20.

Quinine: no distribution of (*Maung, etc.*) (189) 63023-4; people appreciate value of (190) 63034; (*Jolly*) (147). (*See under* Cinchona *under* **CROPS AND CROP PROTECTION**).

Rats: Large number in houses; religious prejudice against killing (*Jolly*) (147); compared with China and Japan (165) 62780-4. Burman hut offers facilities to; slight alteration in design would make a great difference (150); methods of storing rice (151), (167) 62799.

Reclamation schemes in the Delta by pumping silt will improve public health (*Jolly*) (163-4) 62761-2.

Research: necessary (*Jolly*) (152); on diet at Public Health Institution (163) 62753-5.

Rice: Beri-beri not alone due to eating polished rice; very little polished rice eaten (*Jolly*) (158) 62684-9. Fish nearly always eaten with rice (159) 62700-3, 62708. Disagrees with Col. McCarrison as to nutritive value of rice (160) 62719. Unpolished better than polished (167) 62810-4.

Rubbish disposal should be dealt with by circle boards and village committees (*Jolly*) (150).

Sanitary Inspectors: one required for each circle, total 287 (*Jolly*) (148-9).

Sanitary precautions: very little instruction of the people (*Jevons*) (265).

Sanitation in villages (*Maung, etc.*) (189) 63022.

Schools: (*see under* Children *above*).

Self-government, rural local, should be developed (*Dunn*) (70).

Specific diseases, *e.g.*, leprosy and venereal diseases, measures directed against should follow provision of adequate health service (*Jolly*) (151-2).

Standard of living:

Has risen (*Dunn*) (97) 61920-3; high, cause of indebtedness (*Dawson*) (255); high as compared with Indian Peninsula; probably gone up in recent years (*Dawson*) (261) 63781-5.

Impossible to make a living out of agriculture (*Gyi, etc.*) (401) 64858.

In Lower Burma has not appreciably improved during the last 10 years (*Tun, etc.*) (216-7) 63279-85.

Largest earning of a family, after deducting expenses, Rs. 20, or Rs. 30, which is insufficient to pay 15 per cent interest on loans. (Adam Smith and Sismondi quoted) (*Sein*) (355), (351-2), (364) 64664-6, (366) 64698-711, (368) 64728-33.

Raising of Literacy desirable but not necessary preliminary to; agriculture must be made more productive, but danger of increased production being eaten up by increased population; communication creates desire for better living (*Jevons*) (268) 63829-36, (276) 63917-22; importance of correlation and concentration of different measures for improvement; the Punjab example; Board of Economic Development advocated (268-9) 63837-42; Government should raise loans if necessary (270) 63853-8; industrial development desirable (275-6) 63912-6.

Status of agriculturists too low (*Tun, etc.*) (208), (221) 63331.

Sub-Assistant Surgeons:

20 employed at present; 4 years' training in the Government Medical School in Rangoon; pay starts at Rs. 100 and Rs. 150 (*Jolly*) (158-9) 62695-9.

In charge of dispensaries; have not much time to do health work (*Jolly*) (162) 62734-7.

WELFARE OF RURAL POPULATION—*concld.*

Subsidised practitioners not used for public health work ; under Inspector General of Civil Hospitals (*Jolly*) (157) 62672-3.

SURVEYS, ECONOMIC, IN TYPICAL VILLAGES :

Marketing, stockbreeding and cocoanuts (*McKerral*) (43) 61341-2.
Of great value (*Jolly*) (152) ; advocated (*Pan, etc.*) (195) ; (*Sein*) (354-5) ; (*Shwe, etc.*) (387) ; (*Gyi, etc.*) (399) ; not necessary (*Shwe, etc.*) (393) ; not advocated (*McKerral*) (13) ; generally not advisable (*Dunn*) (70), (83) 61799-801.
Reports prepared by Punjab Board of Economics very valuable (*McKerral*) (34-5) 61218-22.
Statement of scope and method of enquiry (*Sein*) (354-5) ; (*Shwe, etc.*) 387 ; should be done by mixed official and non-official committees (*Sein*) (363-4) 64660-6, (367) 64707-11.
Tharrawaddy District : has become quieter (*Hendry*) (64) 61650-3 ; large proportion of crime in (*Dan*) (239) 63551-3.
Thrift, lack of appreciation of advantages of (*Shwe, etc.*) (387).
Unemployment and poverty causes of increased crime (*Pan, etc.*) (198). Usury, the root cause of economic difficulties of cultivators (*Pan, etc.*) (195). (*See under* **AGRICULTURAL INDEBTEDNESS**).
Vaccination: no prejudice against (*Jolly*) (165) 62781 ; an exception to the general principle of dealing with public health before individual treatment (151).
Villages, lay-out, badly planned (*Jolly*) (150). (*See under* Isolation *above*).
Water (*see under* DRINKING WATER *above.*)
Wells and tanks should be protected against contamination ; Engineering Branch of Public Health Department must be strengthened (*Jolly*) (150).
Wireless, not known (*Gyi, etc.*) (403) 64908.
Women : Lady doctors in larger hospitals, not in dispensaries ; except in bigger centres, no special provision for women's diseases ; not sufficient trained midwives (*Jolly*) (162) 62738-42.

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GLOSSARY

Ahlu	A festival.
Akyosoung	An honorary organiser.
Arlein	A harrow.
Awza	Authority or dignity.
Bania	A Hindu grain trader who is generally also a moneylender.
Be-da-bin	The water hyacinth (*eichornia crassipes*).
Berseem	Egyptian clover (*trifolium alexandrinum*).
Bhamade	Interest on capital.
Bhoosi	The husk or chaff of grain ; the straw.
Bobabaing	Non-State land (as opposed to State land in Upper Burma).
Bulu	A race of silk-worms.
Bund	A dam ; field embankment.
Chasam	Tape made from the external layers of the cocoons of silk-worms.
Chaulmoogra	A tree (*gynocardia odorata*), the oil from which is used as a cure for leprosy.
Chaung	A creek.
Chetty, Chettyar ..	A moneylender.
Crore	Ten millions.
Dak	A post ; a stage or station.
Dal	A generic term for food pulses.
Dhainchá	A leguminous fibre plant (*sesbania aculeata*), often grown for green manuring.
Emata	A variety of paddy.
Eri	A type of silk-worm (*attacus ricini*).
Ghi	Clarified butter.
Gwin-set	A revolving harrow.
Hispa	A small insect which attacks paddy (*hispa armigera*).
Ingyin	A forest tree (*shorea siamensis*).
Juar (Juari) (Jowar) ..	The large millet (*sorghum vulgare*).
Kaing	Elephant grass (*saccharum spontaneum*).
Kapas	Cotton with seed still adhering ; unginned cotton.
Kason	A month in the Burmese calendar (about May).
Kaukgyi (Kauk-kyi) ..	Late maturing paddy.
Kauk-yin	Early maturing paddy.
Kazin	A small field bund.
Keseru	A small tree (*heteropanax fragrans*), on the leaves of which the *eri* silk-worm is fed.
Khamru	Home-reeled raw silk (Bengal).
Kikuyu	An African fodder grass (*pennisetum clandestinum*).

Lakh .. .. .. One hundred thousand.
Litchi (Lichi) .. .. An evergreen fruit-tree (*nephelium litchi*).
Longie (Lungi) .. The dress of the male Burman; a voluminous attire

Maistri .. .. .. A foreman; head of a gang.
Makkalam .. .. An indigenous name for an undefined disease.
Maund .. .. .. A measure of weight of 82·28 lb. (standard maund); has different values for different commodities and for the same commodity in different localities.
Mayin .. .. .. Summer paddy.
Merker .. .. .. A grass (*pennisetum spontaneum*).
Mofussil .. .. .. The country as opposed to the town.
Muga .. .. .. A variety of silk-worm (limited to Assam) (*antheræa assamœa*).
Mungoo .. .. .. A bean crop (*phaseolus radiatus*).

Nadaw .. .. .. A month in the Burmese calendar (November-December).
Nayone .. .. .. A month in the Burmese calendar (about April).
Ngapi .. .. .. Preserved fish.
Nga-sein-gyi .. .. A main variety of late paddy.
Ngwe-pyan-toe .. .. Interest, repayable in kind, actually repaid at the money value of the amount of crop due.

Padauk .. .. A large timber tree (*pterocarpus indicus*).
Pagoda .. .. A Buddhist religious edifice.
Patta .. .. A document of lease.
Payapwe .. .. A pagoda festival.
Pebyugale .. .. A bean crop (*phaseolus lunatus*).
Pelun .. .. .. A leguminous plant (*phaseolus calcaratus*).
Phongyi .. .. A Buddhist monk or priest.
Phongyibyan .. .. The funeral obsequies of a monk.
Poongyi kyaung .. A monastery.
Pucca .. .. .. Solid, correct, complete, etc. (the contrast in all respects to *kutcha*).
Purdah .. .. .. A veil; screen; the practice of keeping women secluded.
Pwinbyu Pyaunghaing. A parasitic plant (*striga lutea*).
Pyatho .. .. .. A month in the Burmese calendar (December—January).
Pyinkado .. .. A forest timber tree (*xylia dolabriformis*).

Rabi .. .. .. The spring harvest; crops sown in autumn and reaped at the end of the cold weather.
Ryot .. .. .. A cultivator.

Sabape (Sababe) (Sabapay). A system of borrowing in which the loan is repaid in kind at harvest, *e.g.*, 'A' borrows Rs. 50 in May and repays 100 baskets of paddy in December.
Sapodilla .. .. A species of fruit-tree (*achras sapota*).
Shin-byu .. .. A religious ceremony which takes place when a small Burmese boy is received into a Buddhist monastery.

Tabaung .. .. .. A month in the Burmese calendar (about February).
Tabodwe .. .. A month in the Burmese calendar (about January).
Taccavi .. .. .. An advance made by Government to cultivators for agricultural purposes.
Tagu .. .. .. A month in the Burmese calendar (about March).

Taluka (Taluqa) ..	A local revenue division of a district.
Tasar	A type of wild silk-worm (*anthæwa paphia*).
Taungthu	A cultivator.
Tawthalin	A month in the Burmese calendar (about September).
Tazaungmon	Do. (about November).
Thadingyut	Do. (about October).
Thamadis	A village committee to assess the individual in advance of the *thathameda* demand in a village or town.
Thathameda	An Upper Burma tax on property and circumstances.
Theikpan (plough) ..	An improved plough.
Thugyi	A village headman.
Thugyiza	Land granted to a selected village headman as a reward for good service.
Usar	Land impregnated with sodium salt and thereby rendered barren.
Viss	A measure of weight equivalent to 3·6 lb.
Wagale	Short staple cotton.
Wagaung	A month in the Burmese calendar (about August).
Wagyi	Long staple cotton.
Wape	Repayment of an advance of cotton seed in cotton (*kapas*) at harvest time.
Wazo	A month in the Burmese calendar (about July).
Wunza	The amount of paddy set aside for domestic consumption.
Ya	Miscellaneous upland cultivation.
Zamindari	Property belonging to a big landholder.

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